

VOL. XXXIX No. 10

OCTOBER 1954

MECCANO

MAGAZINE



GANNETS



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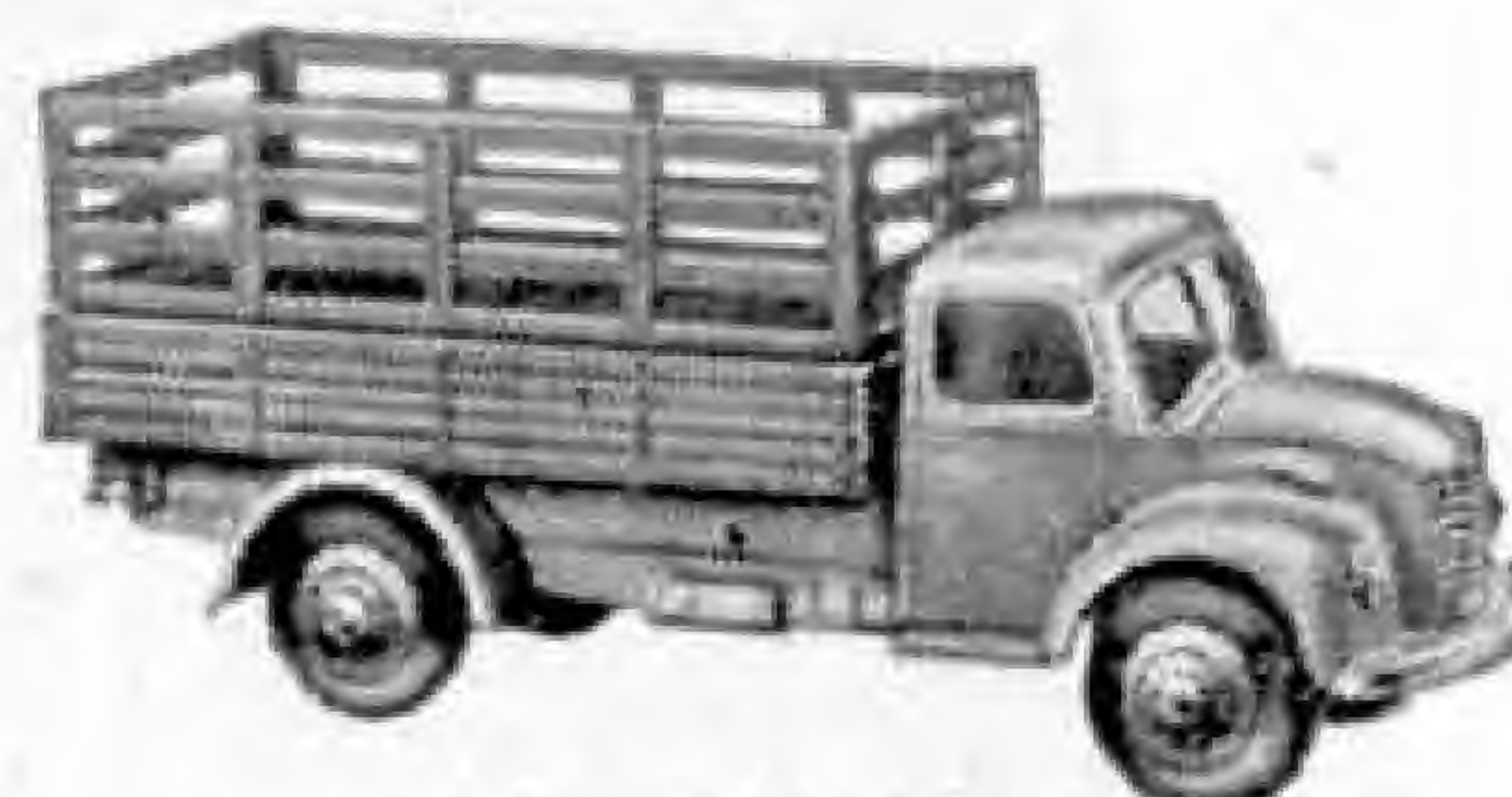
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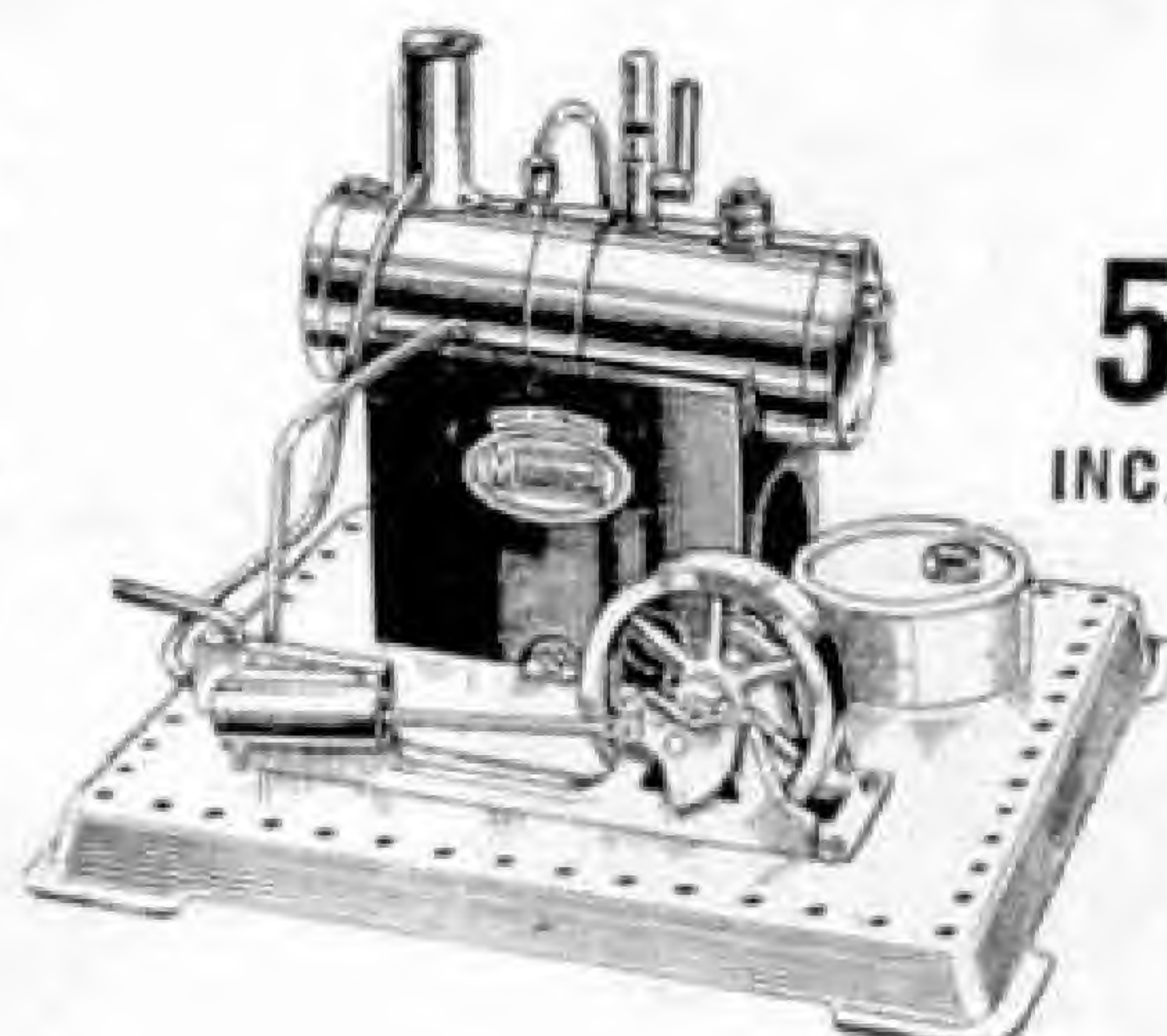


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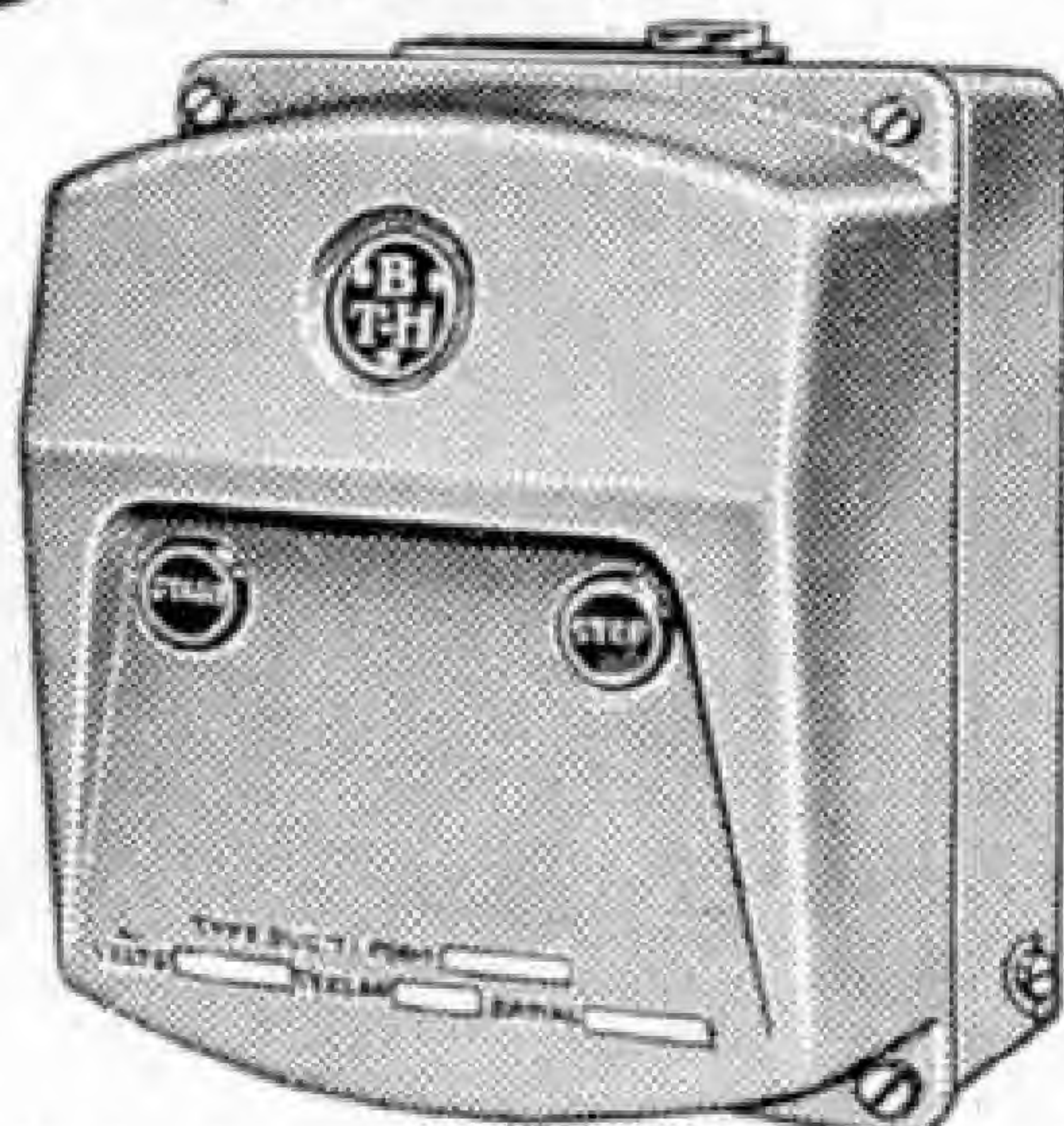
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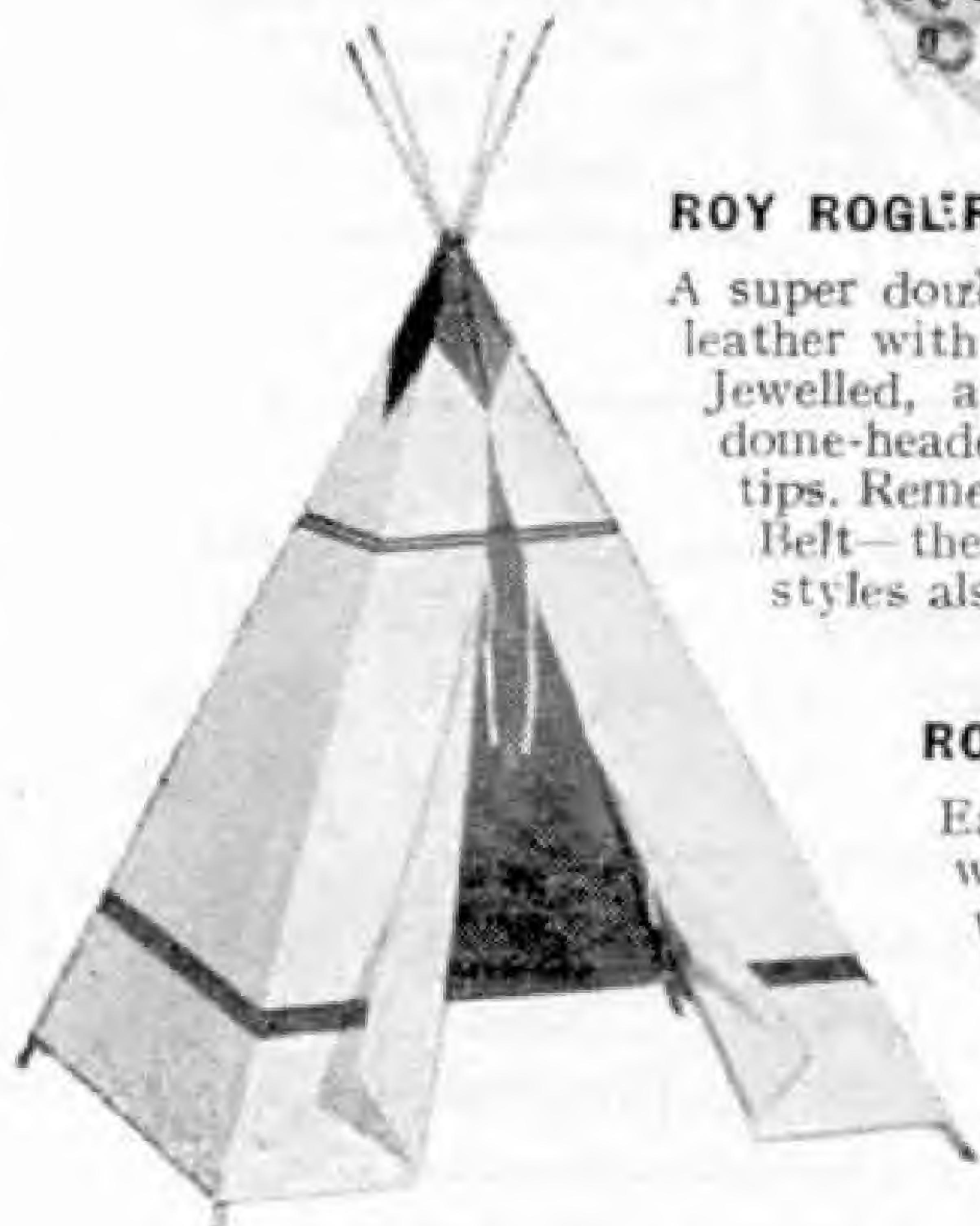
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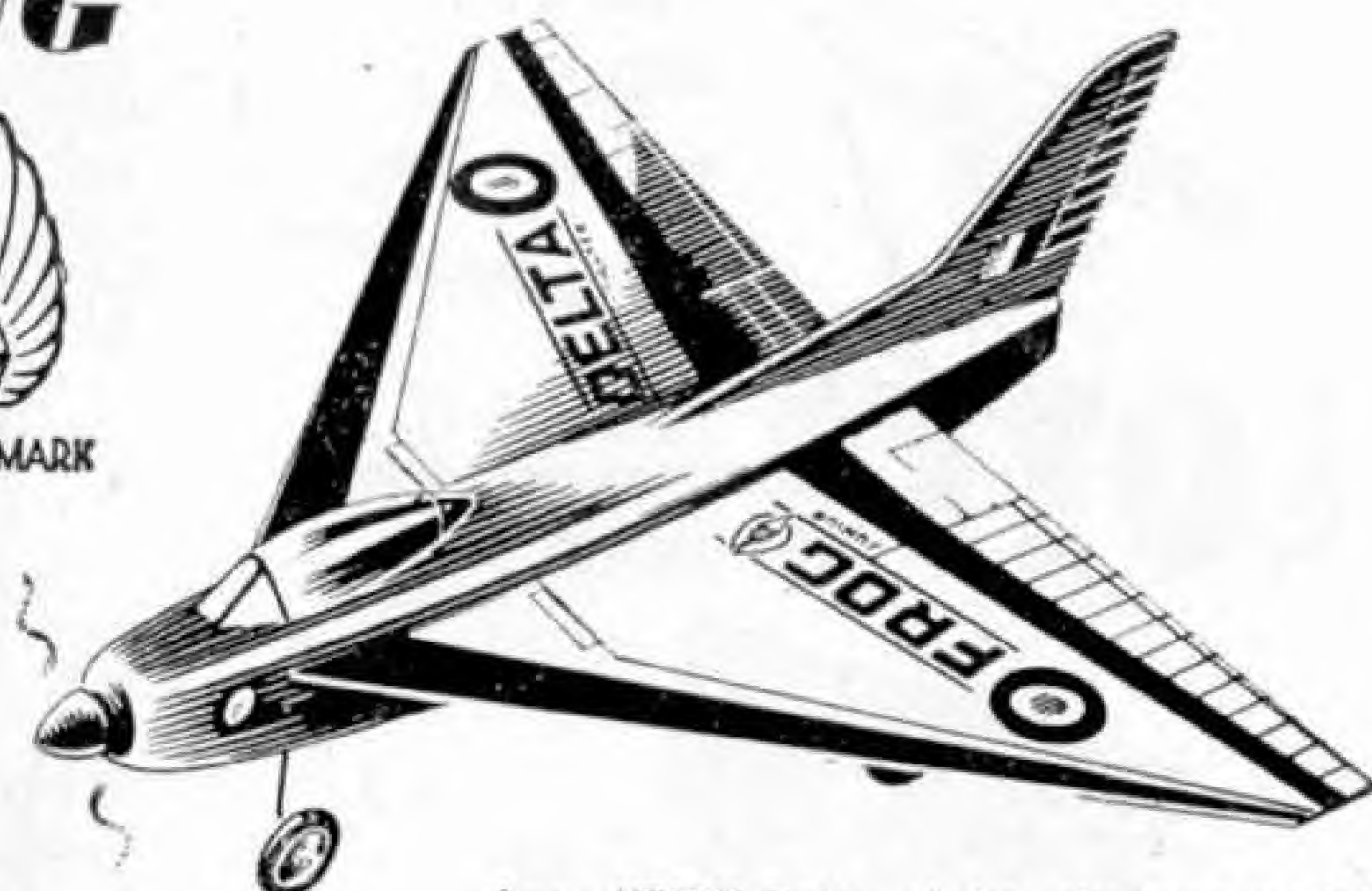
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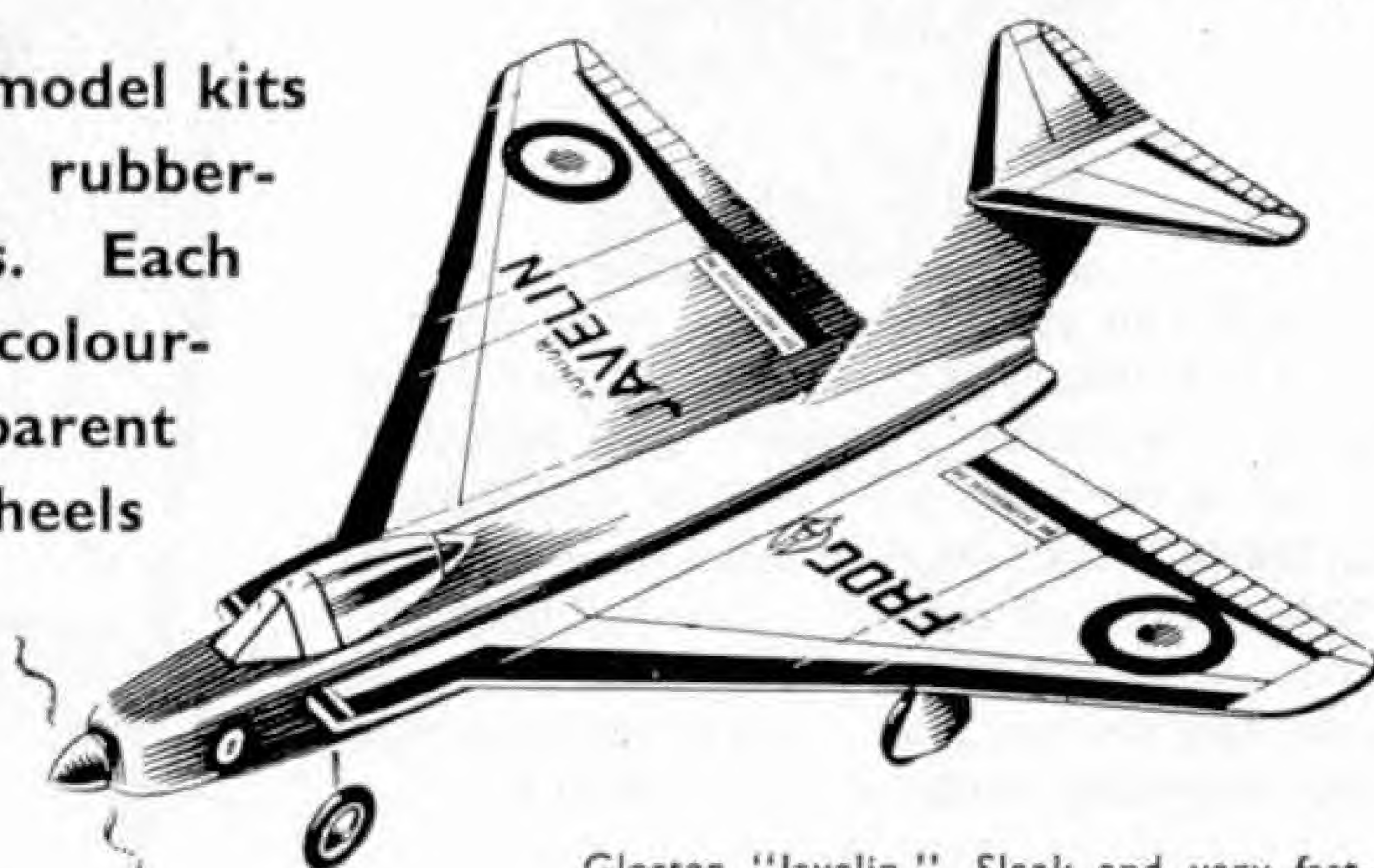
FROG



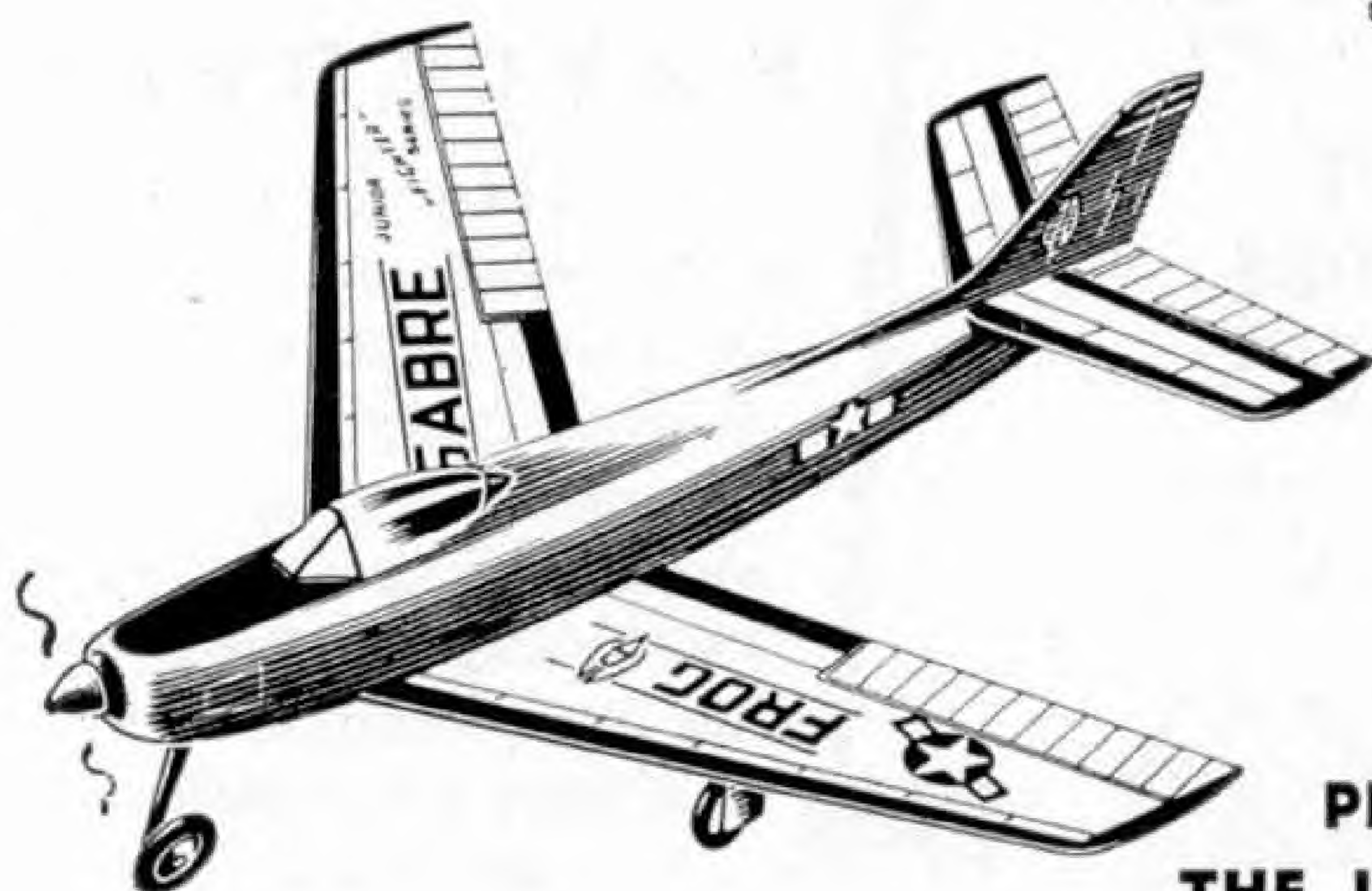
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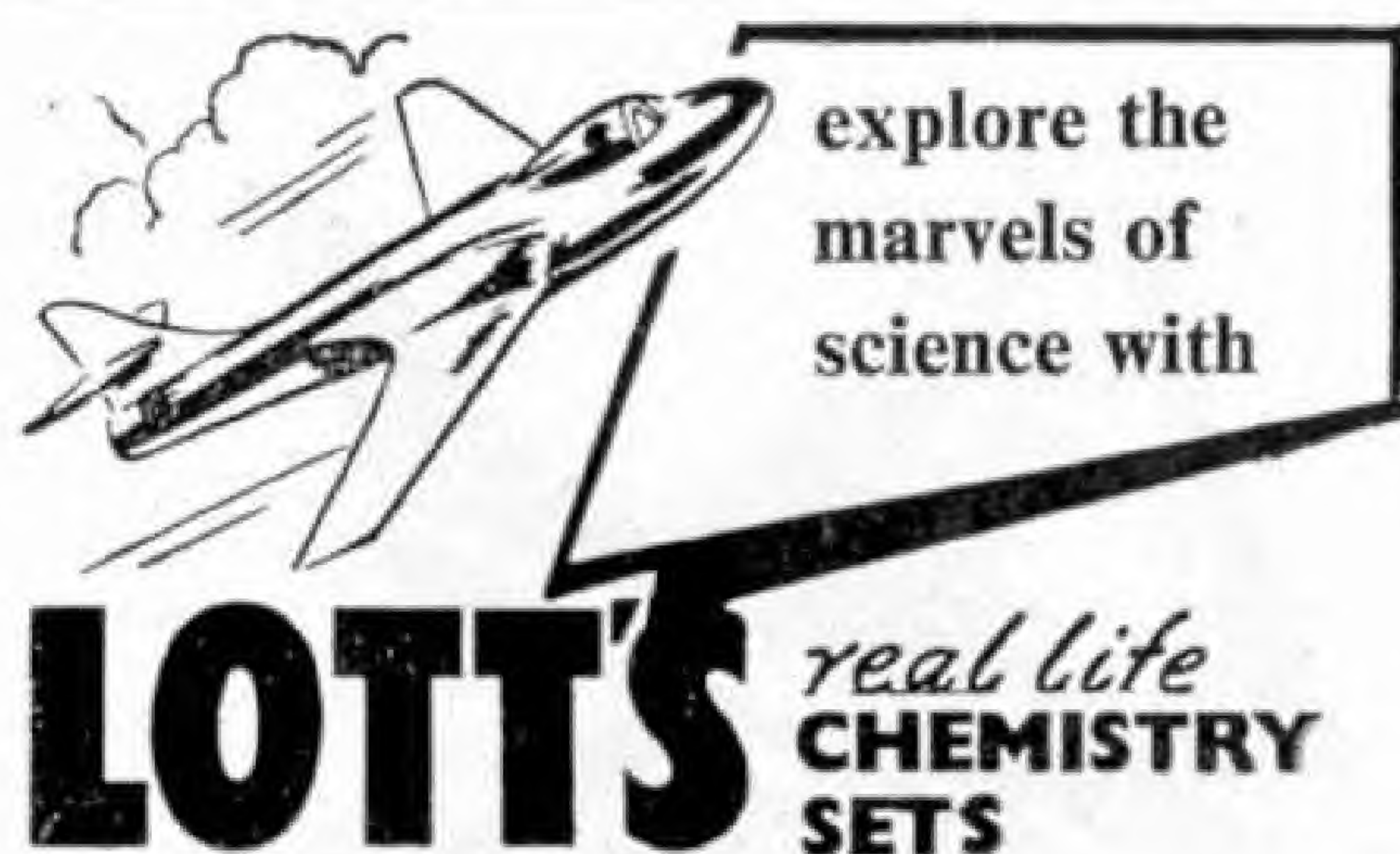
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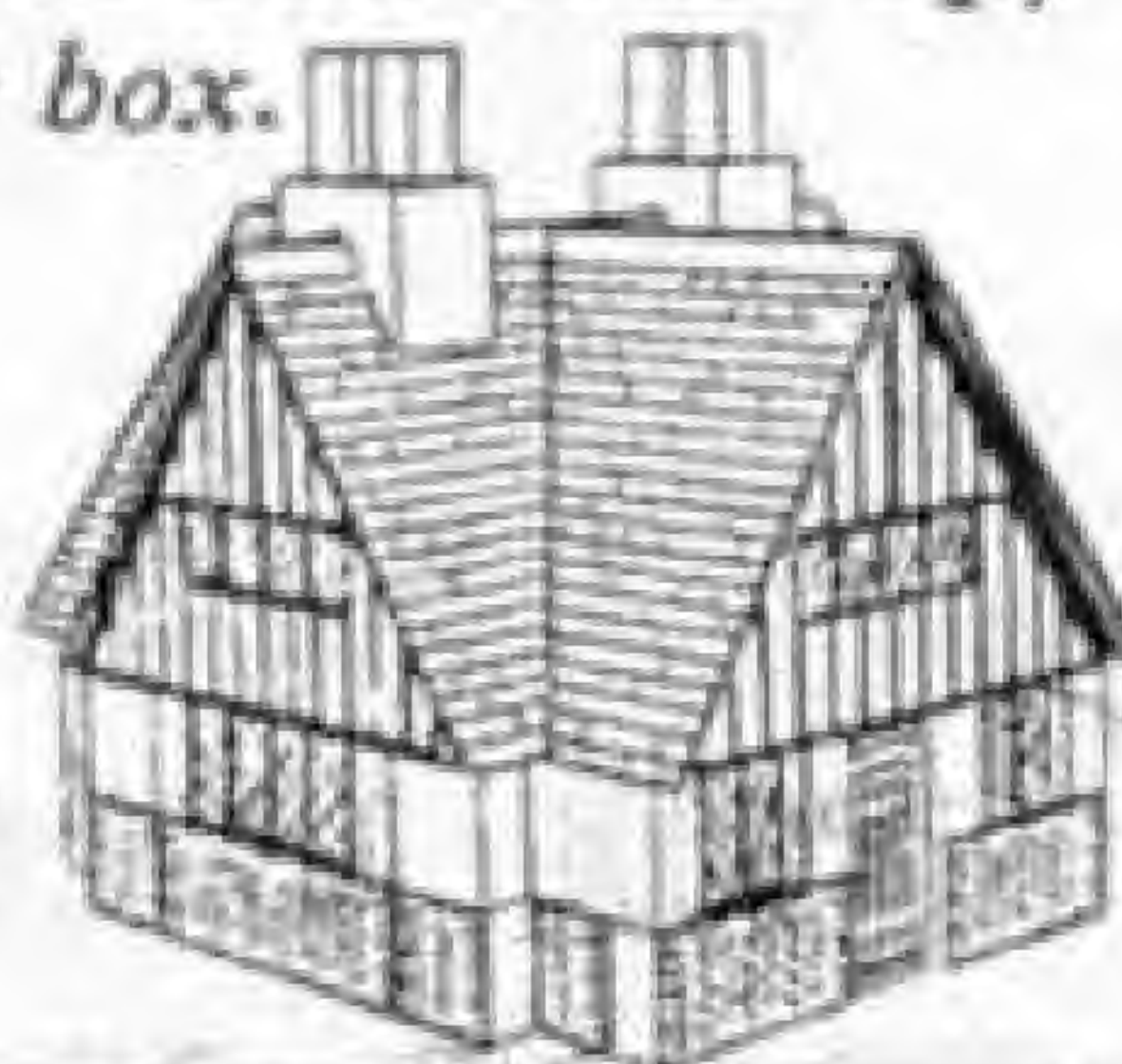
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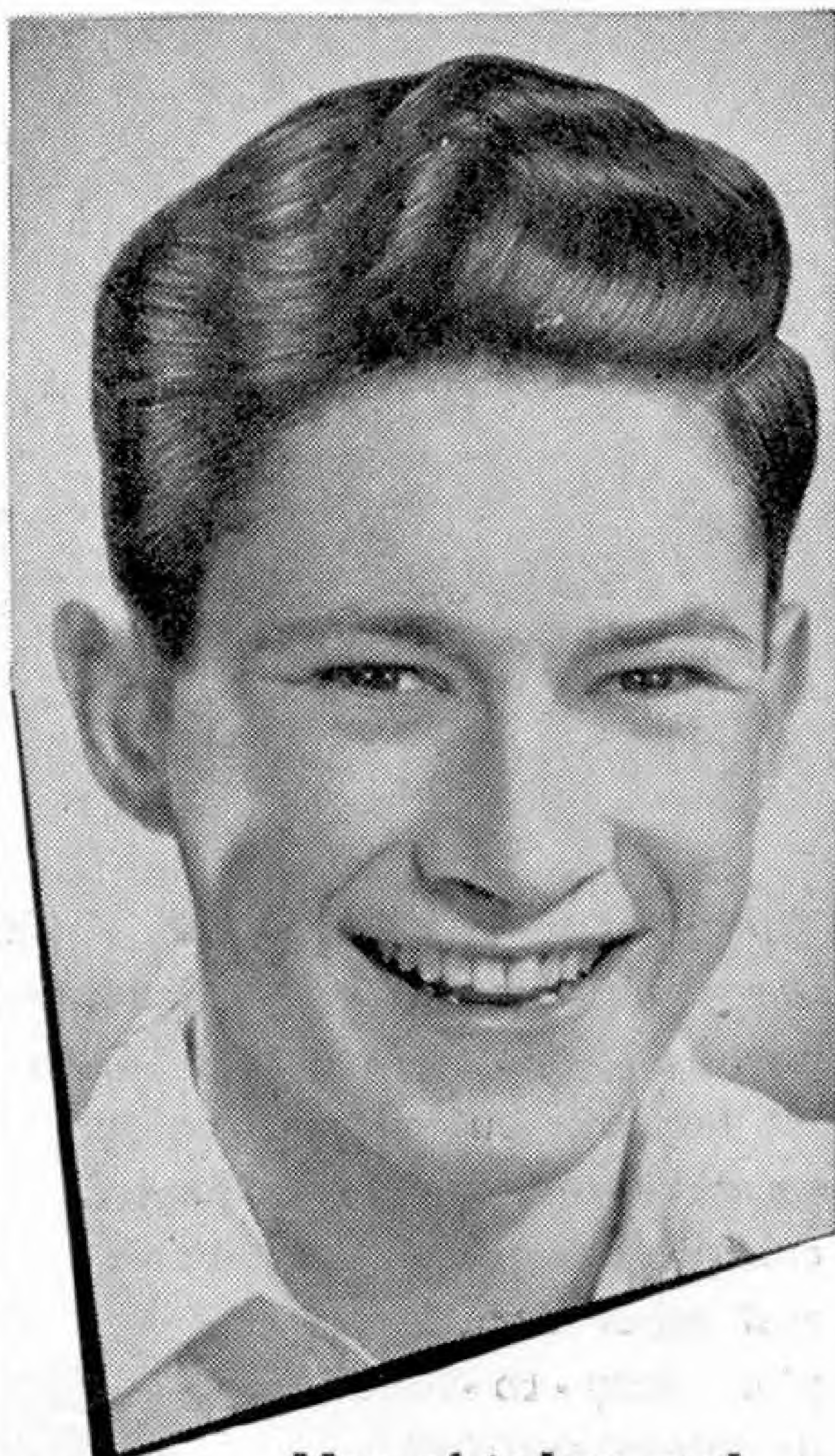
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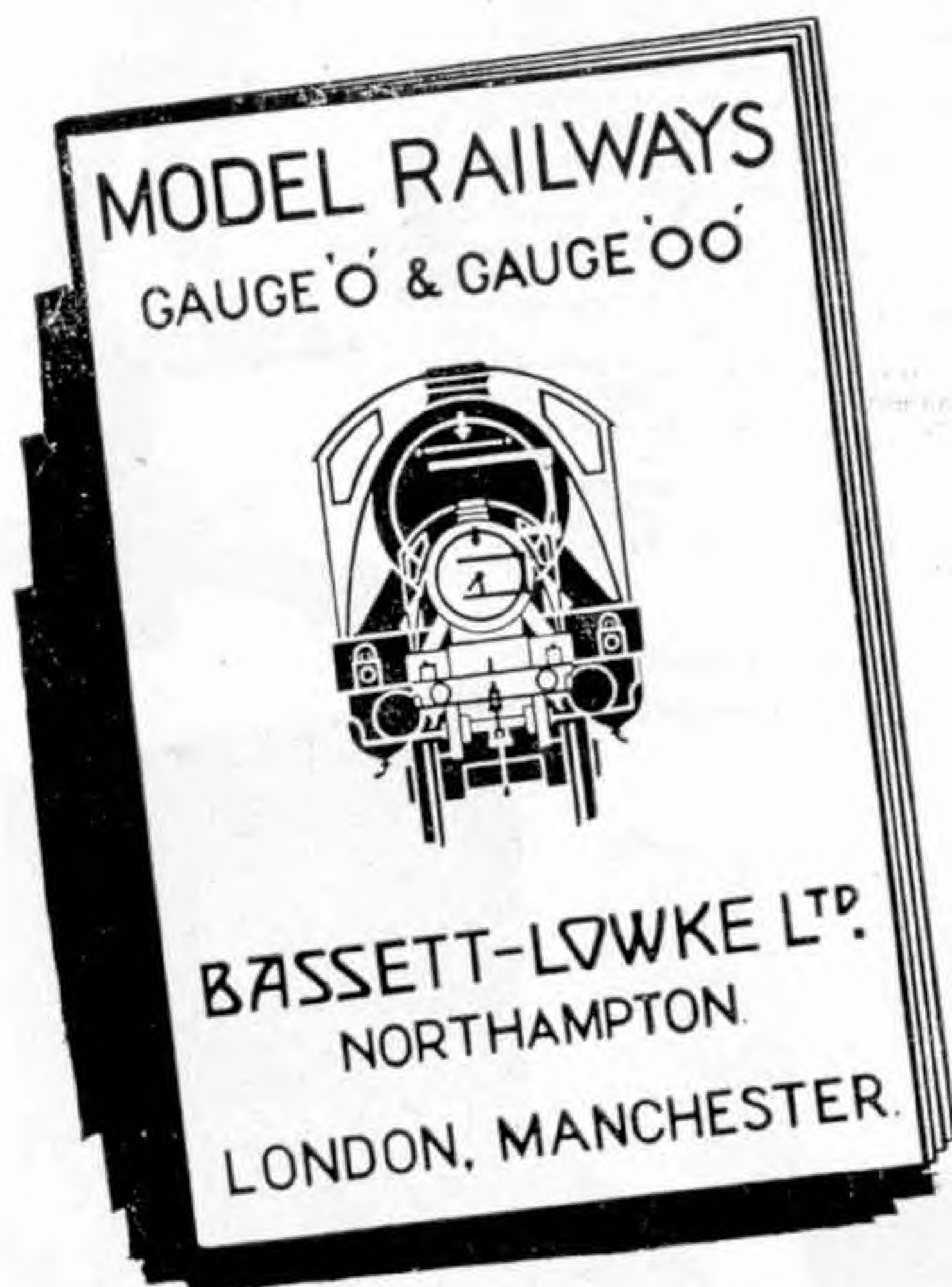
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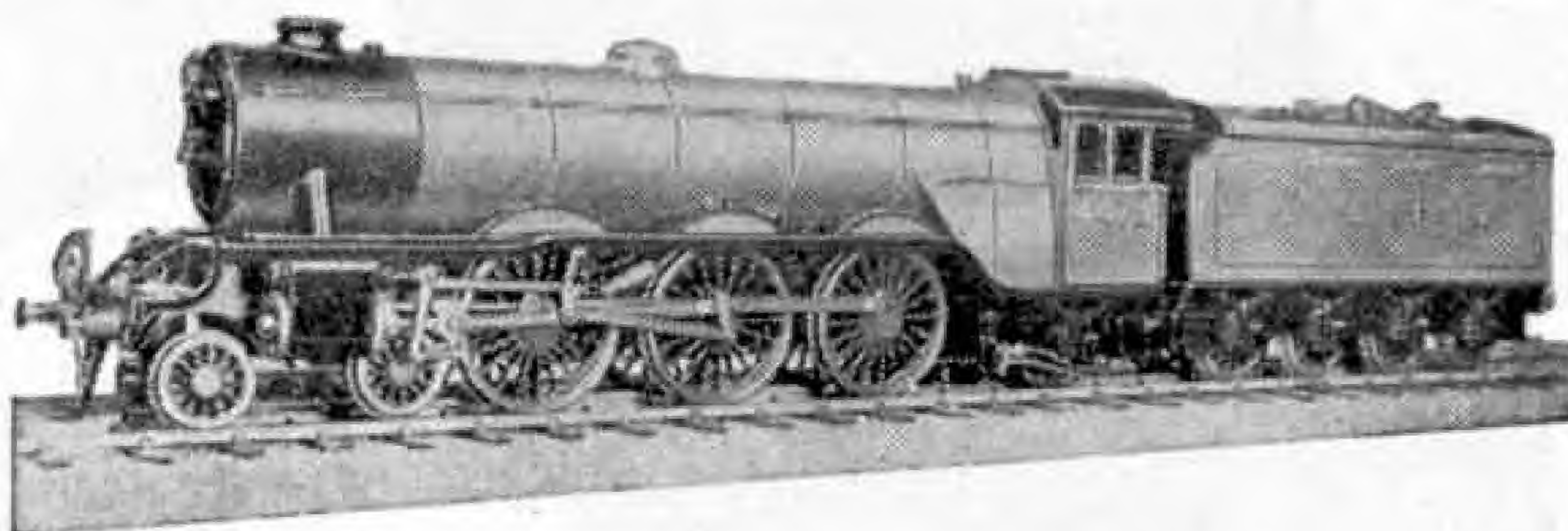


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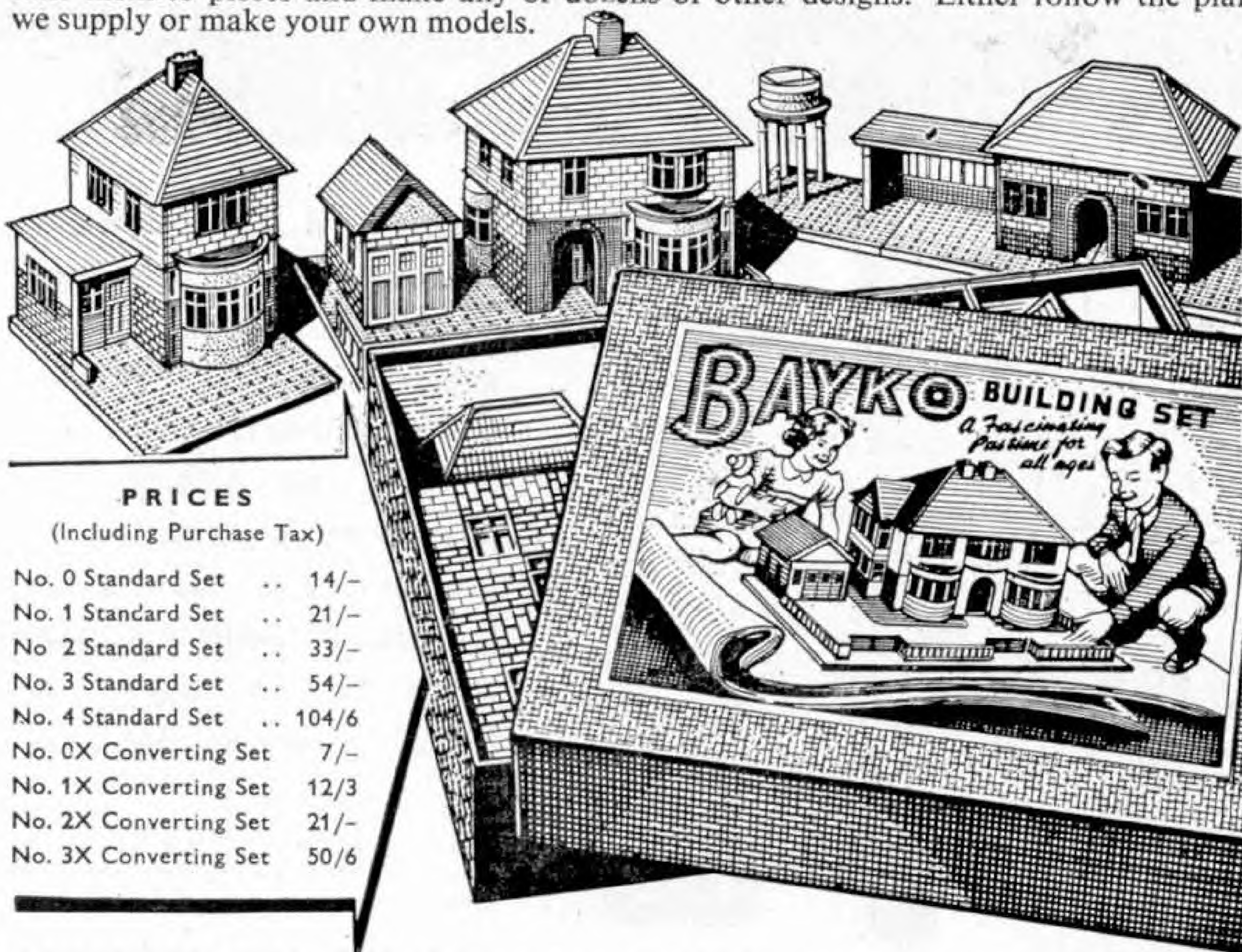
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222



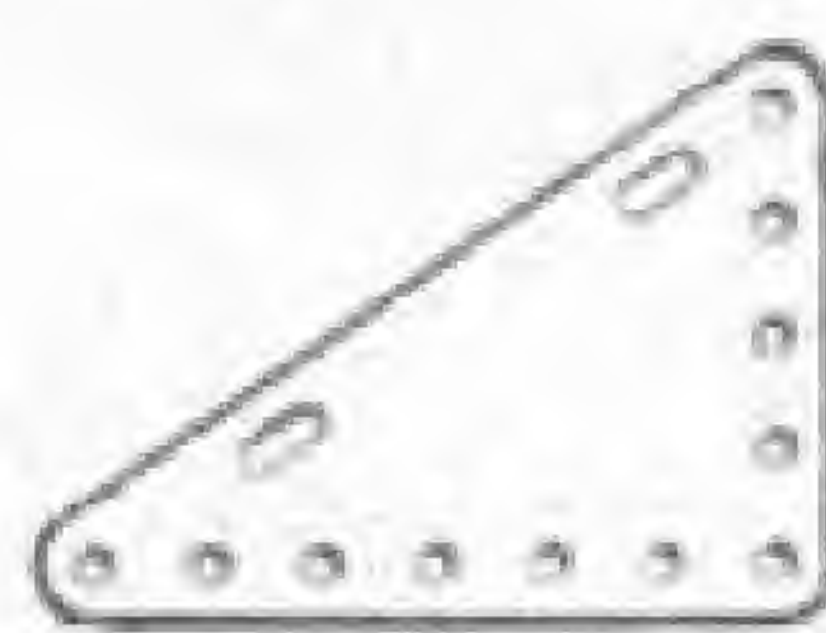
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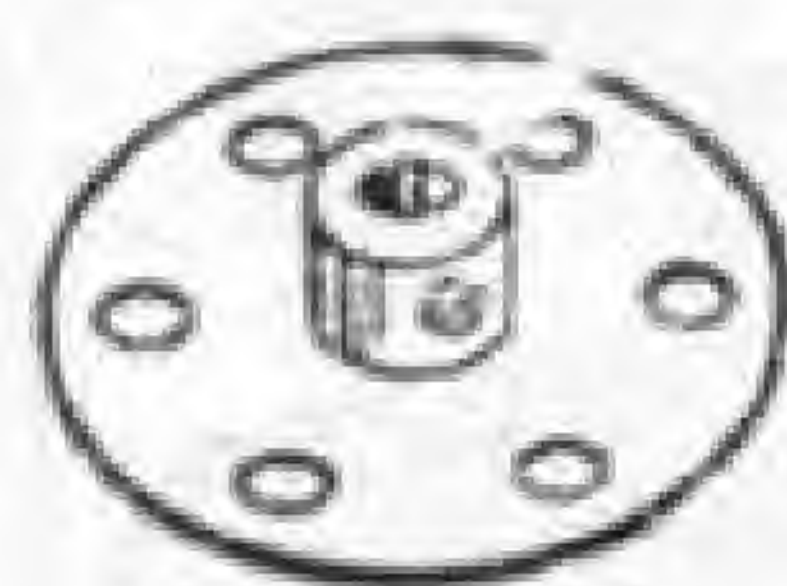
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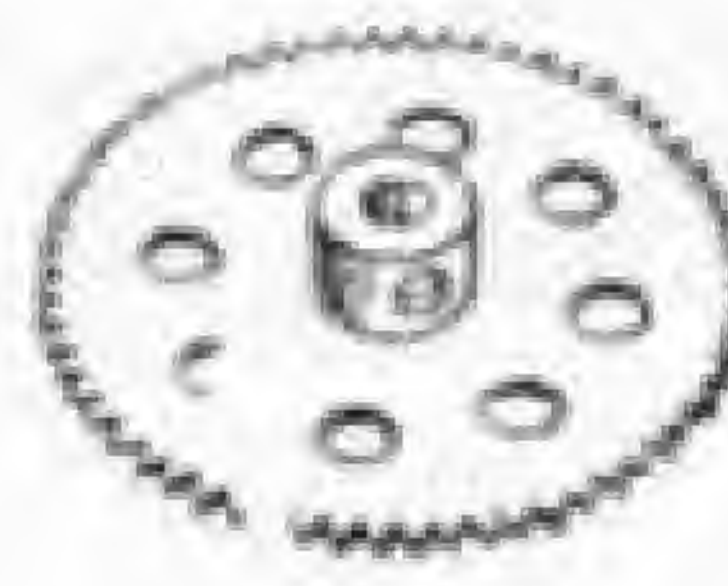
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24b



24c



27d



26c



173a



212a

Meccano in 1954 is better than ever, with new parts introduced into the system, improved Outfits, and Books of Instructions that have been revised and enlarged to include many attractive up-to-date models. Now, a new low-priced Outfit has been added to the range — the No. 00, price 5/6d. (inc. Tax).

The Plates, Gears and other parts illustrated here are entirely new and valuable additions to the Meccano range.

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Next Month: "AMERICA'S FIRST JETLINER." By John W. R. Taylor

MECCANO

MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

EDITOR : FRANK RILEY, B.Sc.

Vol. XXXIX
No. 10
October 1954

At the Crossroads

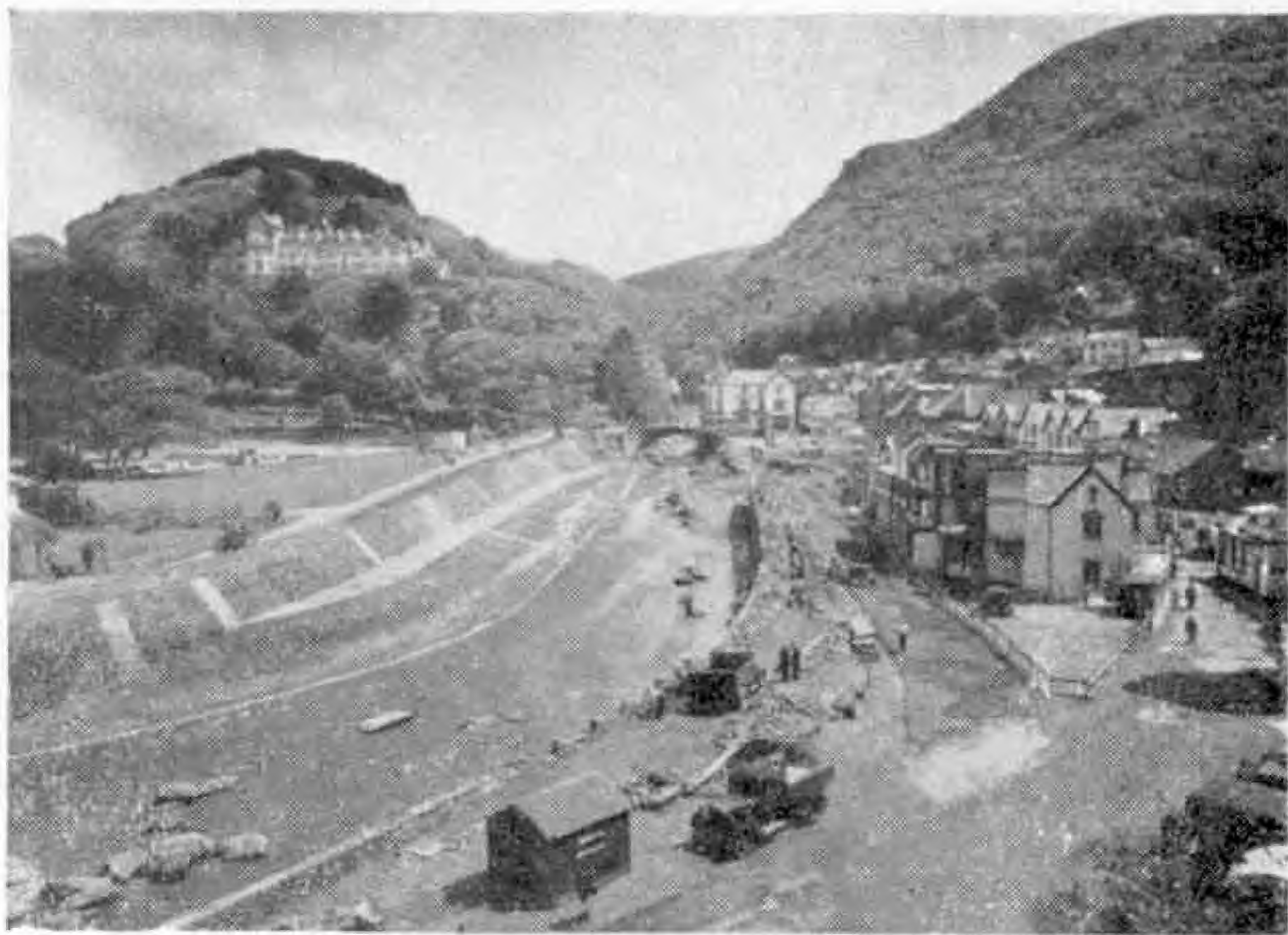
I suppose that many of you saw or heard on television or radio something of the British Association gathering at Oxford early last month. I was particularly interested in this event myself, partly because one or two of the addresses given at the Association's meetings dealt with what I think is the greatest world problem of today—the use of atomic power.

Today we are at the crossroads. If we follow one road atomic power will practically blow civilisation out of existence; if we go along the other it can prove our saviour by supplying the power on which we depend. Peoples who are unable to make use of any power except that of their own muscles, or of those of a few animals, can never rise to such heights of comfort and culture as the more fortunate races who are able to set machines to do their daily work, and for these machines adequate sources of power are necessary.

One of the greatest of these is coal. There is a lot of coal in the world—there is still so much in Great Britain that if it were brought to the surface it would cover the entire area to a depth of more than a yard—but it will not last for ever. Oil is another, but it has been calculated that some of you now reading this page may see the day when oil as a source of power is a thing of the past.

The disappearance of coal and oil will be a catastrophe almost as complete, if not

as spectacular, as an atomic war, if in the meantime some new source of power is not discovered. Now we learn from Sir John Cockroft and other scientists that we have such a source in atomic power.



The great storm that damaged Lynmouth so terribly in 1952 was a destructive outburst of natural power. It has taken two years to restore this lovely Devonshire holiday village and to lessen the risk of repetition. Photograph by Reece Winstone.

If rightly developed this seems to promise all the energy we shall need for another 1,000 years or so. To make this a reality, and to avert mutual destruction, it would be well worth while abandoning some of our old ways of thinking, and concentrating fiercely on ideas and actions in the interests of the whole of mankind, and not merely those of any one section.

The Editor

Canada's First Subway

Toronto's New Underground Railway

By James Montagnes

CANADA'S first underground railway began operations on 30th March last, just 4½ years after constructional work on it was started. It is the first rapid-transit subway system brought into use in Canada, and it will carry 40,000 people an hour in each direction during its busiest times, when workers are going to and coming from their jobs at 9 o'clock in the morning

people indeed was able to continue its business in the downtown area of the city throughout the entire construction. Street cars, motor cars and trucks ran throughout the time, and most of the excavation work was done while traffic continued on the surface.

The Toronto underground system is a colourful one. Passengers can actually tell

their stations by colour, for each of the 12 in the first 4½ mile section is in a distinctive colour scheme. Their walls are finished in one of three basic glass masonry colours, primrose, egg shell and pearl grey, and there are four trim colours used, red, forest green, blue and black. With each station in a different colour combination passengers easily recognise their destinations, and in addition each station carries its name in large letters on the walls.

The latest safety methods are used on this first Canadian subway. These include a standard block signal system operated by a

newly developed automatic punched-tape photo-electric cell train despatching clock, which can carry a complete week's schedules. The machine carries four tapes, each with a different punched timetable, allowing for rush hour, normal and nighttime operation. The machine is controlled from one despatching station, covers the entire route and can be cut out to allow for manual control of train operations if necessary.

Building the subway without causing too much interruption of traffic was a major engineering feat. To allow this, detour street car routes were laid out, and streets were excavated the length of one block of buildings at a time to a depth of ten feet.



Early stage of excavation of a block of Yonge Street. Steel beams are being put in position to support a temporary wooden street surface, while excavation continues below.

and 5 o'clock in the afternoon. It cost Toronto's municipally-owned transportation system almost \$50,000,000, or about £18,000,000 at the present rate of exchange, to build this first section of an underground transportation network that in time will connect all parts of the 240 square mile metropolitan area of the city.

Canada's first subway system was built by American and Canadian engineers and contractors, while its 104 cars were built in Great Britain and patterned on the famous London tube cars. It is operating under Yonge Street, Toronto's main street running north and south, and was built with as little interruption to traffic as possible. The city's population of over one million

Then steel beams or piles were driven into the ground to a depth of 40 to 50 feet, and steel truss beams were placed across the street to rest on the steel piles. After this a temporary street surface was laid with one-foot square wooden beams. On this wooden street surface motor traffic was able to travel and street car tracks also were laid.

Meanwhile excavations continued by hand and by machinery to a depth of 40 to 50 feet, concrete tunnels were built for the underground trains, and above them smaller tunnels for the many public utilities, such as gas, electricity, telephone and telegraph systems. Then sand was filled in between the street surface and the roof of the subway tunnel, and a new street surface paving laid.

The greater part of the Toronto subway is underground, but there are a few



A section of the well-lighted Toronto underground rapid-transit system between stations.

sections where the subway trains come into daylight, in open-cut sections of the route in residential parts of the city. The subway system connects with surface buses and street cars by means of a transfer system, and special machines to accept, issue and time transfers had to be devised. Metal tokens are used to open the turnstiles to allow passengers on the subway platforms.

At the stations the modern type of construction gives a full unobstructed view of the entire 500-foot length of the station. There is continuous fluorescent lighting in the ceilings of the subway stations, with emergency battery-operated lighting installed at regular intervals in the 500 foot light strip. White non-skid safety tiling lines the entire 500 foot platform.

Both stations and tunnels have been acoustically treated to reduce noise. Tunnels between stations have been brilliantly lighted, and in addition to regular stairways, most stations also have electrically-operated moving stairways, which can be operated in either direction, depending on which way passenger traffic is heaviest in rush hours.

The subway cars were built in England by the Gloucester Railway Carriage and Wagon Co. Ltd., the traction and control equipment being supplied by the British Thomson-Houston Co. Ltd. They are bright red in colour. They can be operated from either end and have three doors on each side, with the seats set in clusters so that no passenger is more than seven steps from a doorway.



One of the British-built subway trains coming from an underground section into an open cut section near the maintenance yards.

The Fairey Gannet

By John W. R. Taylor

SELDOM has the pace of aviation progress been better portrayed than in the photograph on this page, for the two aircraft seen flying together over the Needles are separated in service by only ten years.

The Fairey Swordfish biplane was considered almost obsolete before the start of the 1939-45 War, and even its crews affectionately nicknamed it *Stringbags*, because of its profusion of struts and wires. But this did not stop squadrons of Swordfish plodding their steady 90 knot course through five years of air combat, contributing more to victory than many newer, more streamlined warplanes. Indeed,

t h e i r
achievements
in helping to
bring to bay
the German
battleship
Bismarck, in

The old and the
new. Fairey
Swordfish
biplane and its
successor, the
Fairey Gannet,
over the Needles.

crippling a
l a r g e
proportion of
the Italian
fleet at
Taranto, and

in a score of other gallant actions convinced many people that there would never be another naval aircraft so beloved by its pilots or so feared by their enemies.

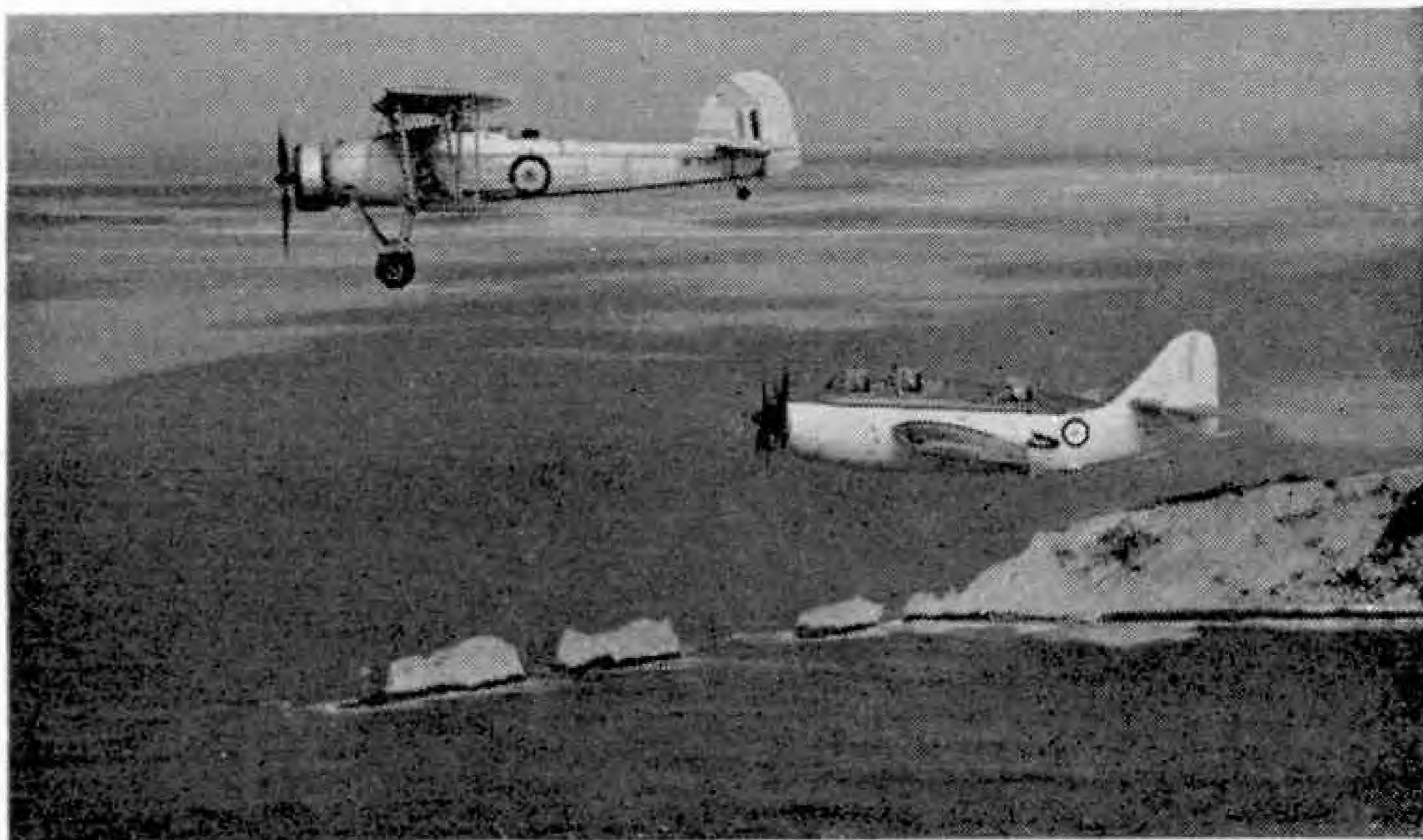
That was before the Fairey Gannet A.S.Mk.1 entered service this summer. Now, the Fleet Air Arm is equally enthusiastic about this tremendously powerful successor to old *Stringbags*; and with good reason, for it is the most modern, formidable naval anti-submarine aircraft in the world.

Its development began when the Ministry of Supply issued Specification GR.17/45 on behalf of the Admiralty. But the prototype for which Fairey's were awarded a contract on 12th August, 1946, was a very different aircraft from the Gannet of today.

Intended for general reconnaissance, as opposed to specialised antisubmarine duties, it carried a smaller crew, different equipment and a much less effective warload. Indeed, the present Gannet has progressed from production order to active service more quickly than some less complex single-seat jet fighters that were ordered several months before it.

Behind this achievement lies a fascinating story, much of which must still remain secret. What can be told gives a very good picture of the trials and triumphs that mark the progress of a modern warplane.

The problems that confronted Fairey designers in 1946 were formidable. They



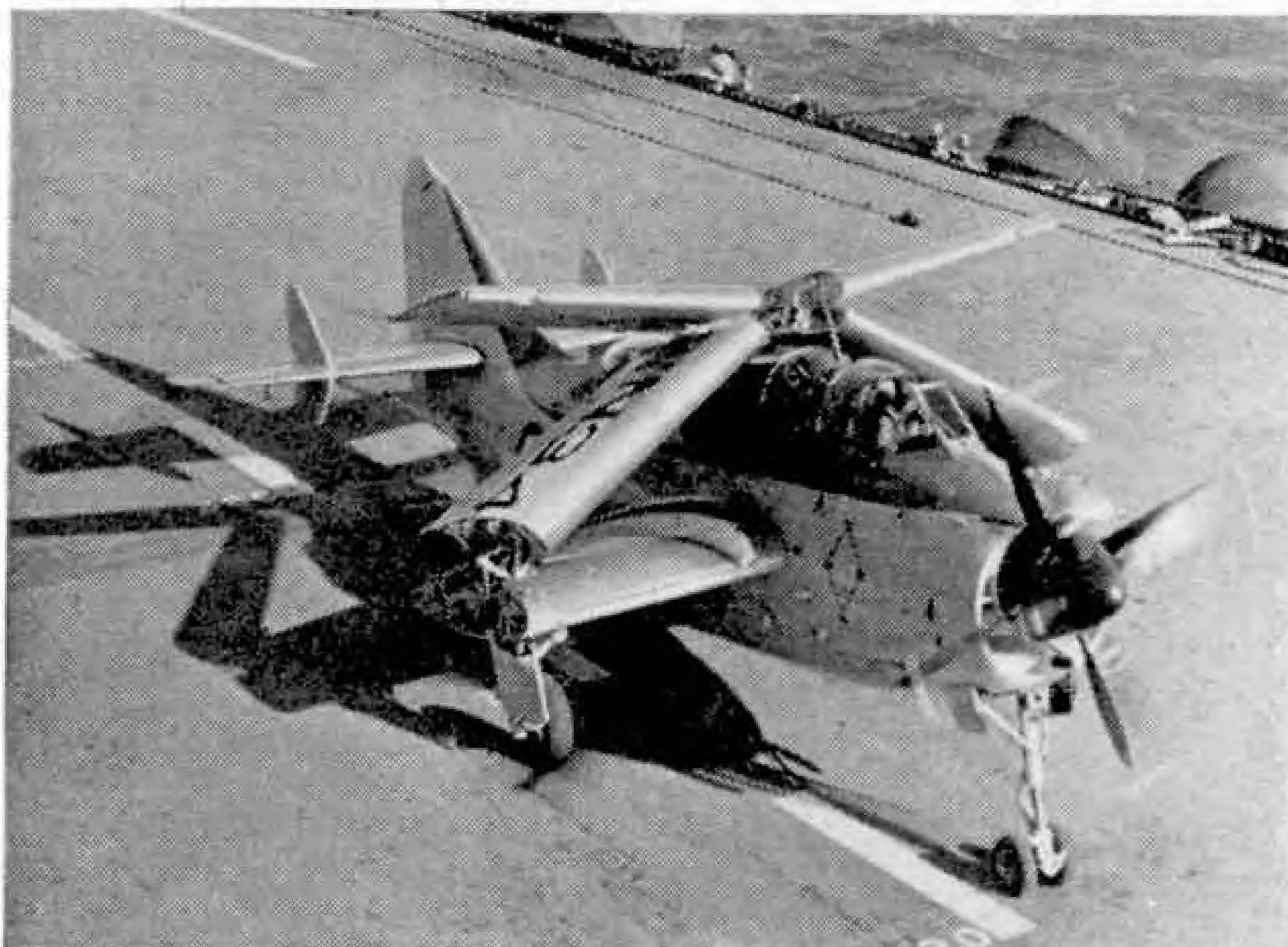
had to pack a crew of two, a powerful engine, lots of fuel, masses of radio and radar, and a heavy warload into an aeroplane that would fold down small enough to go down the lift of an aircraft carrier and into the cramped space of its below-deck hangars.

It would have been comparatively easy to get the power they needed from a single big engine; but this raised problem No. 1. The Navy were becoming more and more anxious to use paraffin-burning gas-turbine engines exclusively in their future operational aircraft, to eliminate the hazard of carrying tanks of high-octane aviation spirit into action in their aircraft carriers. But a single large propeller-turbine of the required power was not

suitable for a reconnaissance aircraft, which needs lengthy endurance rather than high speed; because gas-turbines operate most efficiently at or near their maximum

switched off in flight to save fuel, without any of the handling difficulties which result from asymmetric power in an orthodox "twin".

Soon Fairey's had persuaded Rolls-Royce to develop a double power plant using two Tweed propeller-turbines, which were then proposed to power the big Princess flying boat. But before long the Tweed was dropped, so they asked Armstrong Siddeley to look into the possibility of mounting a pair of their small Mamba propeller-turbines side-by-side in a single installation, driving co-axial propellers. The result in due course was the Double Mamba, which, in its latest form, gives 2,920 shaft h.p., plus 535 lb. of jet thrust, which is equivalent to 3,125 total h.p. for an



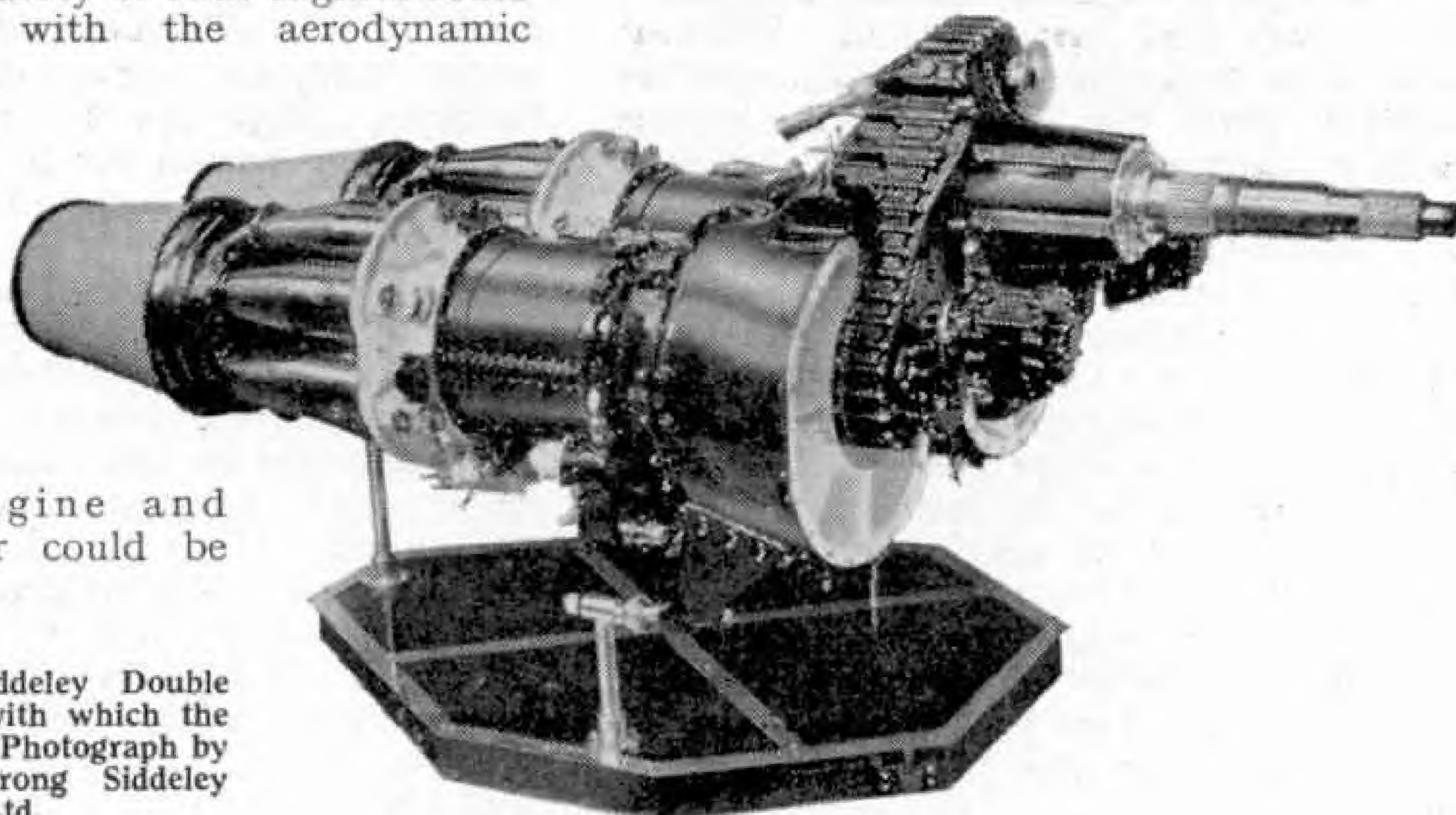
A Gannet, with wings folded, aboard an aircraft carrier. One engine is stopped.

engine weight of only 2,100 lb.

With such an engine available, Fairey's

were able to pack everything into an incredibly compact airframe. The Double Mamba was small enough to go between the cockpits and the "lower deck" housing the nose wheel and bomb-bay. As a result it was possible to put the pilot well forward, ensuring an exceptionally fine all-round view for deck landing and reconnaissance. The importance of this cannot be over-emphasised; for even the best radar can bring a pilot only within

One solution was to use two smaller propeller-turbines, so that one could be stopped in flight to increase endurance; but the need to keep down the width of the aircraft with its wings folded precluded the use of wing-mounted engines. It was then that Fairey's Chief Designer, Mr. H. E. Chaplin, had the idea of mounting two small turbines side-by-side to form a "double engine", driving a pair of co-axial, contra-rotating propellers. In this way, the power and safety of twin engines could be combined with the aerodynamic advantages of a single installation. Furthermore, if each engine were geared to drive its own propeller, completely independent of the other engine and propeller, either could be



The Armstrong Siddeley Double Mamba turboprop with which the Gannet is powered. Photograph by courtesy of Armstrong Siddeley Motors Ltd.

reasonable range of an object like a *schnorkelling* submarine. After that he has to look for it with his own two eyes.

To ensure quick take-off, even when heavily loaded, and slow landing approaches during carrier operation, Fairey's gave their GR.17/45 prototype plenty of wing area, with big aerofoil type flaps. This resulted



in a wing span of 54 ft. 4 in., but carrier stowage problems were overcome by a very neat double wing-fold action. In fact, when folded, the wings are below the level of the tip of the aircraft's rudder.

Not only the design and power plant of the GR.17/45 were to be revolutionary, however, for Fairey's decided to build it by a new process called "envelope jigging", which they had just patented. Without going into technical details, this involves starting with the outside skin of the aircraft, clamped inside a jig, and building inwards; instead of attaching the skin to a completed structure of ribs, spars, frames and stringers in the usual way.

This guarantees a perfectly accurate outside shape (or "envelope"), and speeds production, as the jigs can be built as soon as the aircraft's shape has been decided, without waiting for the inside structure to be worked out. It also means that jigs built for the prototype can be used eventually for production machines; and even the least skilled workers cannot make mistakes as all rivet holes are reproduced in the jig, with the rivet sizes clearly indicated.

The original two-seat prototype GR.17/45 made its first flight at Aldermaston on 19th September 1949, piloted by the Company's Chief Test Pilot, Group Captain Gordon Slade. But meanwhile the Naval Staff had modified their thinking and asked for the aircraft to be developed into a three-seat specialised anti-submarine "hunter-killer".

This involved very considerable re-designing; but nearly all of the changes were simulated on the third prototype

A production Gannet of No. 703X Flight. This picture emphasises the good view from the pilot's cockpit. Photograph by courtesy of "Flight."

which flew on 10th May, 1951. Most apparent were the provision of a third cockpit for an additional radar observer just forward of the fin,

and the appearance of two auxiliary tail fins.

Between the first flight dates of these prototypes, intensive development and test flying took place, the most important event being on 19th June 1950, when the original GR.17/45 became the first aircraft with propeller-turbine engines to land on an aircraft carrier. In its subsequent deck landing trials aboard H.M.S. *Illustrious*, it made 27 take-offs and landings in one day under varying conditions of take-off distance, ship speed and so on—an outstanding record for a new prototype.

Nor were tests confined to home bases and waters, for one of the prototypes completed more than 33 hours test flying whilst based at Malta, to study the effect of hot climates on its performance.

Things did not always go smoothly; and near midnight on one occasion, when the whole day's work obstinately refused to come right, all concerned were weary and disappointed. On a sudden inspiration, one of the test pilots who was still there with the team, aided and abetted by one of the Company's directors, took charge of the canteen. There, complete with chefs' caps and aprons, they (Continued on page 508)

Natural Gas in Britain

The Beginning of an Exciting Search

By T. Holloway

AN exciting quest is under way in Britain—a £1,000,000 five-year search for natural gas. It is early yet to prophesy to what extent the undertaking will prove successful, for although it has been known for many years that natural gas exists in several parts of the country, it has yet to be ascertained if it exists in commercial quantities.

The first announcement of the intention of the Gas Council to begin the search was made at a meeting of the Institution of Gas Engineers in May last year. There were two main reasons for the Council's decision. The first was the cost of coal, the industry's raw material, which was £25,000,000 more a year than it was in 1949. Since 1953 the price has risen still higher and the industry is now faced with an extra annual cost in the region of £30,000,000. The second was the increasing scarcity of suitable gas-making coal. The demand for gas is increasing, but known reserves of good carbonizing coal are decreasing.

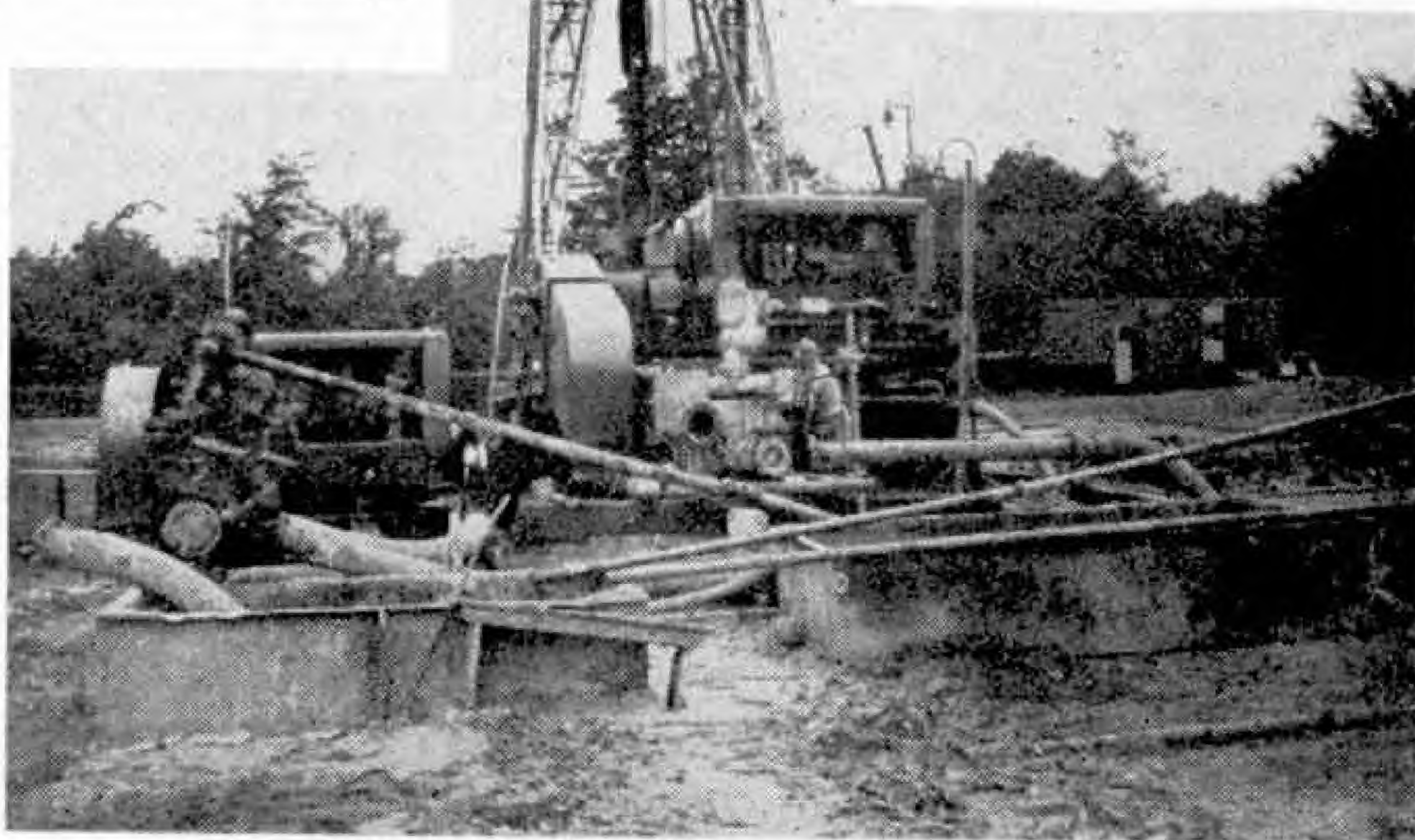
America, Canada and Italy have abundant supplies of natural gas and its use is a great benefit to their economies. No coal has to be bought; the gas can be piped into existing mains or gas works; and it is not a difficult or expensive matter to convert or dilute it for use by the consumer in the normal types of lighting and heating appliances to be found in most houses and factories.

Natural gas consists largely of methane, which is often referred to as marsh gas because the bubbles seen in marsh pools consist chiefly of methane. It is a simple hydrocarbon produced by decaying vegetation or decomposing coal. Beside being present in swampy areas, it occurs in mines as the dreaded "fire-damp," which has been responsible for so many mining disasters.

Underground the gas is found in large quantities in minute pores or fissures of sandstone or limestone, rather similar to a microscopic sponge. A great advantage of this is that when the gas is withdrawn, the underground formation remains as solid as ever and there is no risk of subsidence.

Natural gas is frequently encountered when prospecting for oil and the Gas Council was fortunate in engaging the help of Dr. G. M. Lees, F.R.S., who was then Chief Geologist of the Anglo-Iranian

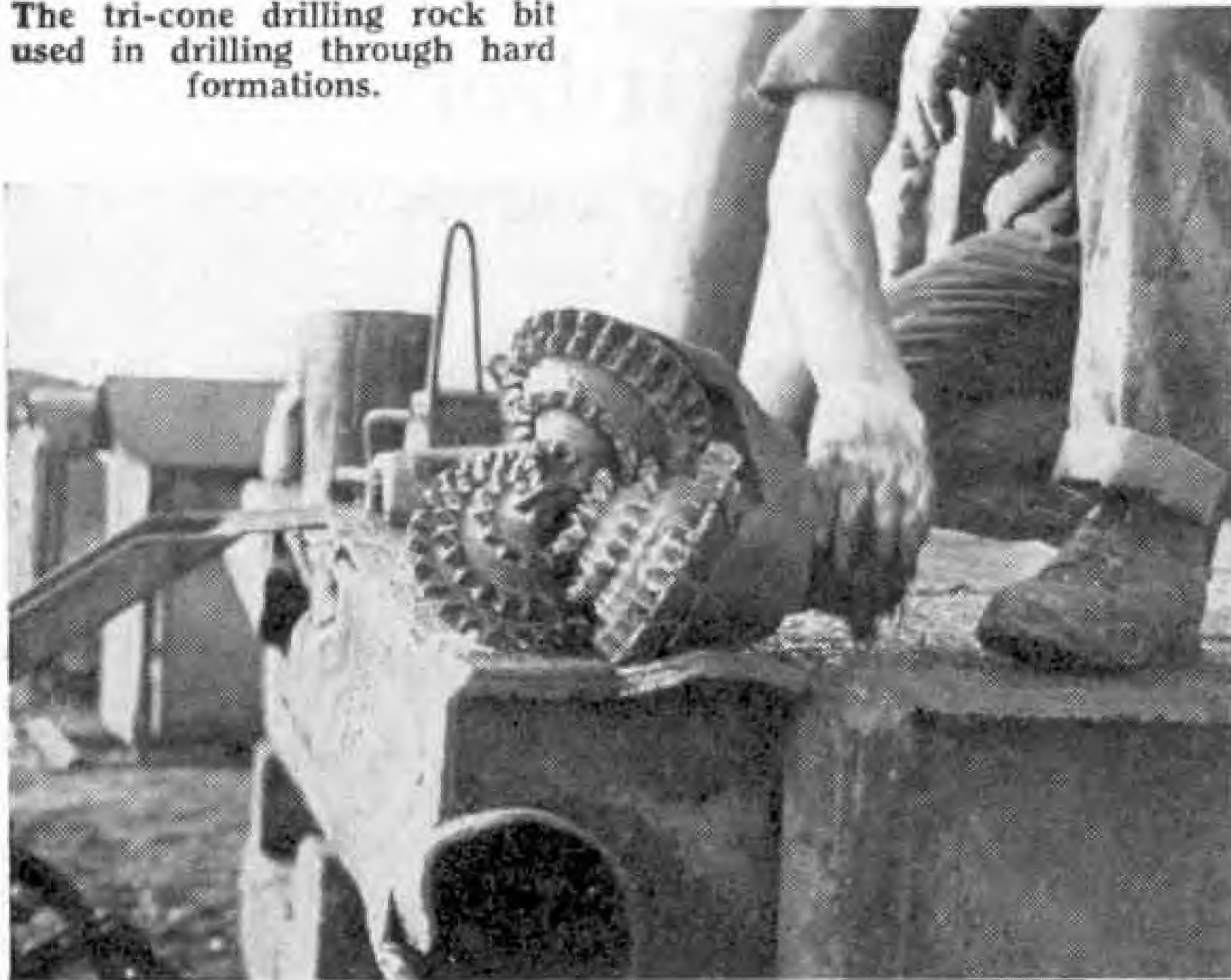
The drilling rig and power units, with mud pits in the foreground, at the Gas Council's drilling site for natural gas at Crowborough Warren, Sussex.



Oil Company. It was his advice that encouraged the Gas Council to embark on its ambitious large-scale plan of exploration.

The prospecting work is being carried out on behalf of the Gas Council by the D'Arcy Exploration Company, the prospecting subsidiary of Anglo-Iranian Oil Company, which has had many years of experience in all parts of the world of the geological work and drilling techniques necessary. From a technical point of view, searching for natural gas is very similar to searching for oil, although gas and oil are not necessarily found together.

The tri-cone drilling rock bit used in drilling through hard formations.



The first activity began in November 1953, when a seismic survey party commenced operations near Aldbrough, near the Yorkshire coast between Hornsea and Withernsea. The team was equipped with light drilling outfits, and a number of shot holes each about 100 ft. deep and 5 inches in diameter were bored. In each of these an explosive charge was placed and fired. The vibrations thus set up were recorded on sensitive instruments.

From a series of such recordings the shape of the sub-surface rock structure can be deduced, down to a depth of three miles if necessary. If the report of the seismic survey party is favourable, the actual drilling sites are then selected.

From Aldbrough the survey party continued their work along a line from the Yorkshire coast through Beverley to Market Weighton. Shortly afterwards a second party began surveying a line from Stixwold to the Lincolnshire coast south of Louth.

The first deep drilling was undertaken in January of this year at Cousland, near Edinburgh. Natural gas was found there in 1938 when the D'Arcy Company was prospecting for oil. At that time, for various reasons, it was decided not to exploit the supply and the well was sealed off. The well sunk in January proved disappointing, but as the chances of successful borings are usually rated at one in five, a second well has been sunk and as I write geologists are assessing results.

It has been known for many years that supplies of natural gas exist in the Crowborough region of Sussex. For a long period the railway station at Heathfield was lighted by natural gas and many Sussex people remember the incident of the "burning bog" at Hammerden. After drilling a number of geological holes along a line from Wych Cross to Ticehurst, in order to gain a knowledge of the underground contours in the area, a deep drilling site was selected near Crowborough Warren, in the vicinity of Ashdown Forest.

Drilling began early in the summer. As it was not

expected to find gas near the surface, plans were made to drill down to a depth of 2,000 ft. By the time this article is in print the drilling should have been completed, but it will take the geologists a considerable time to assess the significance of the evidence yielded by the drilling operation.

Great care is taken in the preparation of

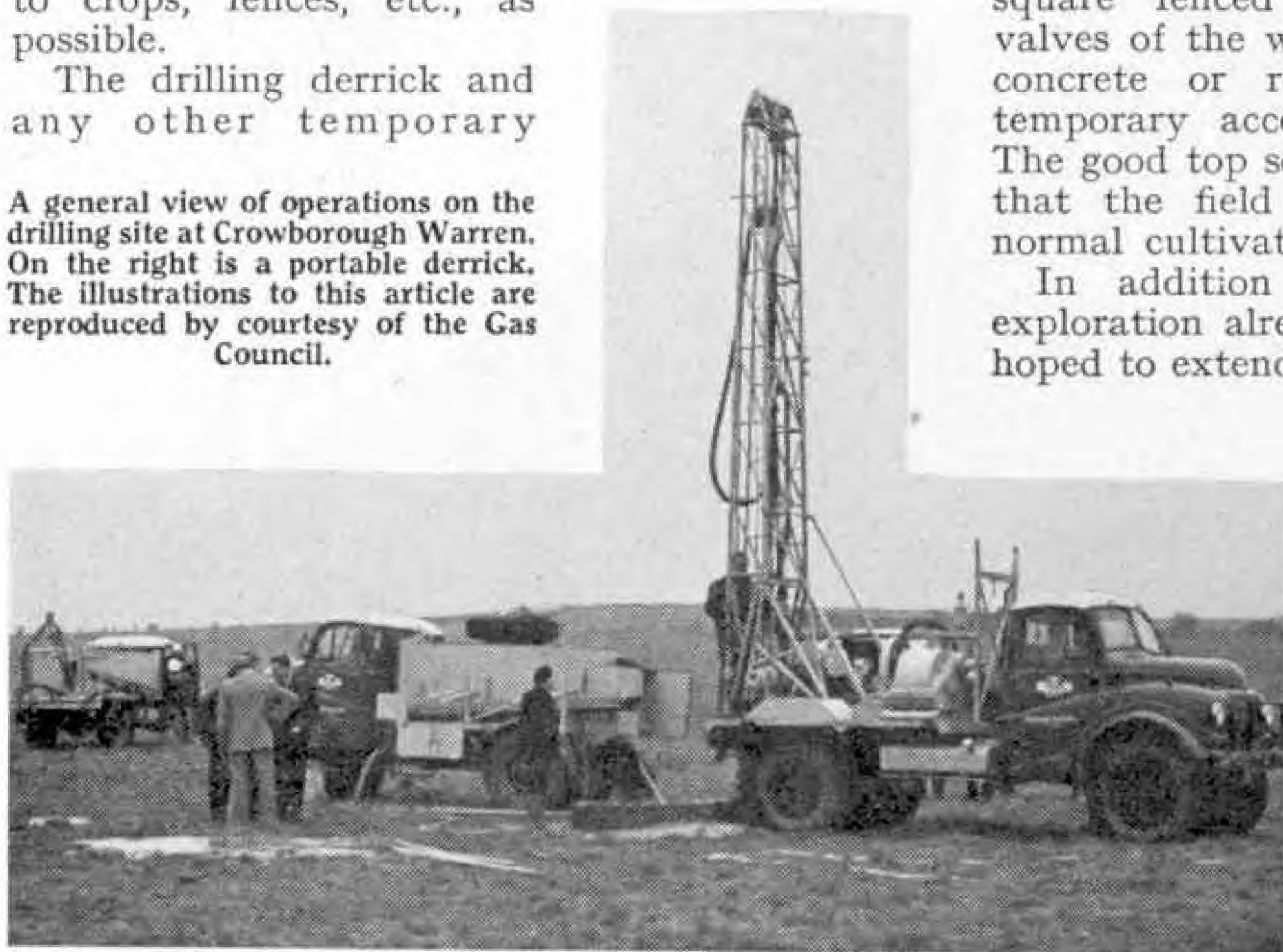
A shot fixer explodes a dynamite charge. Soil blown 50 ft. in the air.



drilling sites to avoid permanent damage to the area. The fertile top soil is bulldozed to one side so that it can eventually be replaced, and every effort is made to cause as little disturbance to crops, fences, etc., as possible.

The drilling derrick and any other temporary

A general view of operations on the drilling site at Crowborough Warren. On the right is a portable derrick. The illustrations to this article are reproduced by courtesy of the Gas Council.



installations, such as water pipe-lines and tanks, are only necessary during the few months of actual drilling, and are removed when the well is complete. If gas is found there may be a temporary period when it is necessary to burn a flare in order to test the quality of the gas available. At times this may roar but it is safe.

If a well should prove a good producer, pipes are laid underground to the nearest gas works or gas main. Any unsightly surface equipment is removed, leaving only a small area of about a dozen yards square fenced in, containing the valves of the well head. Any stone, concrete or road metal laid for temporary access is also removed. The good top soil is then replaced so that the field can be restored to normal cultivation.

In addition to the regions of exploration already referred to, it is hoped to extend the quest during the next four years to Cheshire, Warwickshire, Worcestershire and counties along the south coast from Kent to Dorset.

Colonel Sir Harold Smith, K.B.E., Chairman of the Gas Council, speaking recently at the Crowborough

drilling site, observed: "Even if our first efforts do not show very positive results, we shall not despair, for we have every reason to hope that during the course of the five years success will come in one area or another. The one thing that is certain is that if we do not seek we shall not find!"

More About Dinky Toys—(Continued from page 479)

grille and the lamps.

The conveyor table along which mask spraying of this kind is carried on is a fascinating place. At each station there is a miniature spraying booth in which the work is done, with an exhaust tube leading upward to carry away fumes and unused spray. The masks used vary in accordance with the needs of the particular Dinky Toys under treatment.

Baking follows to harden the enamel and then the parts are ready for final assembly. Each Dinky Toy requires its own special assembly methods. But all cars and lorries want wheels and axles. The wheels themselves are die castings, which are sprayed the necessary colour. Tyres are placed on them and they are fitted on the axles, which are made in the machine shop, and are retained by rivet-shaped heads formed on the ends of the axles by means of a specially shaped riveting tool.

Where a Dinky Toy consists of a body and base, the latter of which is a steel pressing in almost all instances, the necessary preparations for this assembly start with die casting, for the castings usually are made with small projecting spigots that fit into corresponding holes in the base. All that is necessary therefore is to fit the body and the base together, with the spigots projecting through the holes, and then to spread out the ends of the spigots to fix the two in position. This is carried out with a spinning tool specially

shaped to press down and open out the ends of the spigots.

This is the general method of assembly, but certain Dinky Toys call for individual treatment. Our Big Bedford Lorry is an example. It is dealt with in the manner already described as far as the cab and chassis and the steel pressing at the front end are concerned. This you will see on turning over your own Big Bedford. The body is fixed on the chassis by means of three lugs, which are cast on it. One is at the front of the body and fits into a slot in the back of the cab. The others, specially shaped, project downward through slots in the chassis, and small holes in them provide bearings for the back axle.

Another point of interest concerns the wording that is to be seen under a Dinky Toy. Usually this is embossed on the steel pressing that forms the base, but in the Big Bedford Lorry it is moulded under the cab and chassis casting. Representations of such things as petrol tanks, tool boxes, etc., also are cast. These are all sharp and clear, and give evidence of skill and patience in preparing the die, and of the quality of the castings themselves.

Now our Dinky Toys are complete, except for final inspection. After this they are packed in the familiar boxes in which they appear in the shops, and very soon they are on the way to the dealers, ready for their enthusiastic admirers.



Mississippi Cotton

IN centuries past, the raging Mississippi River periodically flooded miles of the low, flat land of northern Mississippi. Its receding waters left fertile, alluvial soil deposits as far east as a ridge of low hills, which cut through the middle of the state in a shallow arc from Memphis, Tenn., to Vicksburg, Miss. At one point, near Greenwood, Miss., these hills are 75 miles east of the river.

This area, known as the Mississippi Delta, is now "flood-proof," protected the entire 200 and more miles of its length by a giant levee maintained by the United States Corps of Engineers. It has been developed to become one of the nation's leading producers of long staple, high quality cotton.

Night and day after the cotton harvest Memphis Division local trains of the Illinois Central Railroad are on the move in the Delta, transporting the crop to mills and ports. Most of them are powered by class 2030 Pacific locomotives. Mikados handle some of the work as well. On a bright sunny morning, engineers and conductors of these trains will look out of their locomotive cab windows, or their caboose cupolas, to see snow-white cotton "puffs" held in the green and brown fields that stretch to the horizon on either side.

This article briefly describes how cotton is grown and harvested in the Mississippi Delta, a famous cotton growing area in the United States. It is reproduced by courtesy of the Editor of the Illinois Central Magazine, and the illustration at the head of this page shows Illinois Central Railroad locomotive 276 with a train of cars loaded with cotton from the Delta.

Planting of cotton begins early in April and continues through May. If rain or drought should move in, planting must be done as late as June. Seed is planted row upon row in well-prepared ground, pulverized by tractor-powered discs and harrows. Mules did the work of preparing the ground and planting the crop 15 years ago, but it's all mechanised in the Delta now, and if you should spot a mule in a field, you're seeing a rare sight.

Cotton plants appear within 10 days after sowing. The overcrowded rows are thinned and one plant is left standing every 12 or 18 inches. This thinning is the first hand labour performed by the Negro plantation workers, who bring to life the times written about in modern romantic novels of the

Old South. During the thinning, the first grass and weeds which have sprung up with cotton plants are removed. The weeding is called "chopping." After the plant matures sufficiently, its own shade retards further weed and grass growth.

Protective dusting begins when the plants reach a height of 24 inches. Aeroplanes sweep over the fields, spreading a fine, chemical dust which destroys cotton's arch enemy—the boll weevil. The planes dust in early morning or late evening,



A cotton picking machine at work. This combs the cotton from the plants, and the fibres are sucked up into a bin on top of the machine. The umbrella is for protection from the sun.

when dew clinging to the plants will hold the fine insecticide powder. A liquid spray is dropped from planes when conditions make its use more effective.

White blossoms, which within 24 to 48 hours turn first pink and then red, begin the development of the cotton boll. The petals fold and dry to leave a square, four-sided pod, which continues to grow to the size of a hen's egg. First green, the boll slowly turns to brown as the cotton growing inside begins to ripen. The first bolls begin to "explode" and expose "open cotton" about the middle of August. It is then that picking begins and it continues through November.

Before the cotton can be picked by machine, the plants must be stripped of their leaves. Again planes move on to the scene, with a chemical spray which kills only the leaves. The process is called "defoliation." Until five years ago all picking was done by hand. Machines

were only in the talking stage. Now 20 per cent. of the total North Delta crop is picked mechanically.

Negro workers still play a major part in cotton harvesting. In one field the Negro men and women, bent low, move among the rows of cotton, their brown fingers deftly plucking the white tufts from the centres of the hardened boll petals. There is one long tuft of cotton lying over each of the four sections of the boll pod. Pickers usually begin their day in the field around seven in the morning. They work until evening. A fast picker can gather about 300 lb. of cotton a day. One Negro field worker won \$2,500 in a contest by picking more than 100 lb. in just two hours.

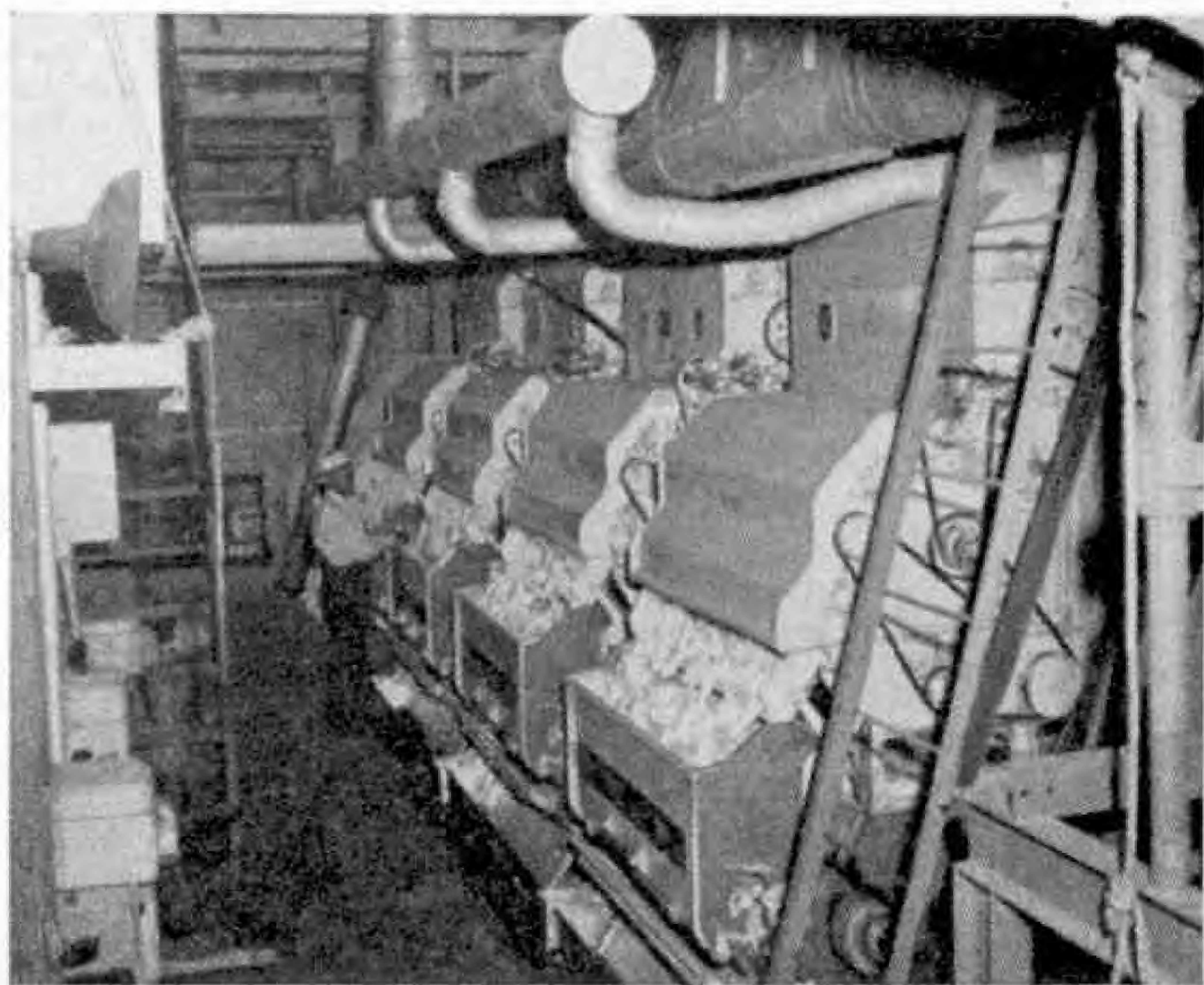
Over the low singing of many of the Negroes while at work comes the sound of the big cotton-picking machines, rumbling through a field on the other side of the Illinois Central's tracks.

Mechanically picked cotton is dumped from the machine bin into large trailers. The cotton picked by hand is dumped from the workers' sacks into either a small storage house in the field, or into a smaller trailer which holds the equivalent of five to six bales of cotton. Both types of trailer are pulled by truck to the cotton gins.

Cotton-laden trailers coming out of the fields are unloaded at the gin installations by vacuum into hoppers over as many as 12 separate ginning machines. Within the machine, cotton is "combed" and the seeds separated from the fibre. The de-seeded or "lint" cotton is drawn by vacuum again into hoppers over the baling machine. The seeds drop

(Continued on page 508)

In the ginning machines cotton falls over rapidly rotating circular blades, called gin saws, which separate seeds from the cotton lint.



Railway Notes

By R. A. H. Weight

More Concrete Sleepers and Mechanical Aids

The use of concrete sleepers may be considerably extended on British main lines, as in their improved form they should last longer than wooden ones. In this connection British Railways have designed a new fastening for securing the latest type flat-bottom rails to concrete sleepers. This should make for smoother travel, prolong the life of the sleepers and help to check rail creep, or movement. The fastening consists of two steel clamps secured into wooden plugs, which grip the foot of the rail on each side. Rubber pads will absorb vibration and provide electrical insulation of the rails, so that track circuits can operate, making for greater safety.

Millions of parcels are sent by rail every year. Considerable economy and time saving will be effected by the introduction at principal stations of machines, something like those used in Post Offices and elsewhere, which will print on the spot the necessary stamps for affixing to parcels and also the labels required for routing and record purposes, impressing also the name of the station, date, serial number, etc.

British Railways' Winter Speed-Up

The winter timetables now in force schedule very largely the standard services operating for at least nine months of the year, and include a number of accelerations compared with last year, as well as the retention of many of the very fast timings introduced in the summer of 1954. The quickest of the latter is the *Bristolian*, covering the 118 miles each way between London and Bristol in 105 minutes, from Mondays to Fridays. There are 47 start to stop runs timed to average 60-67 m.p.h. overall; the *Royal Scot* and the *Midday Scot* are notably accelerated this winter; the *Cambrian Coast Express* continues to run to and from Paddington; sleeping cars are provided on the Paddington-Birkenhead route; and there are over 500 restaurant or refreshment car services daily and more light-weight diesel trains will soon be ready.

Southern Tidings

The *Atlantic Coast Express* figures in a number of exciting logs I have received from good friends. On the down run to Salisbury, allowed only 83 min. for 83½ miles from Waterloo, the new S.R. diesel electric locomotive No. 10203, driven hard, I imagine, cut this fast booking by 4 min. in spite of a permanent way check before Wimbledon, averaging 65½ m.p.h. over the 63½ miles between Weybridge and Tunnel Junction, just outside Salisbury. When Merchant Navy type steam locomotives were on, No. 35020 *Bibby Line* took 84½ min. gross, or only 79 nett allowing for signal and track repair slowings, touching 82 m.p.h. past Andover and 86 down Porton bank. *Union Castle Line* did almost as well,

not attaining quite such high speeds, and arriving in 84 min. actual or 80 min. nett. The 11-coach load represented about 390 tons behind the engine including passengers and stores.

With 12 on, 430 tons gross, No. 35018 *British India Line* had to slow severely owing to engineering work between Hook and Basingstoke and then averaged 80 m.p.h. for 11 miles, passed Tunnel Junction, 82½ miles in 81 min. She stopped gently in Salisbury less than a minute late. On to Sidmouth Junction, now in charge of Salisbury instead of Nine Elms men, with 11 on, the 76 steeply undulating miles were covered in no more than 74½ min. nett. Hauling a coach less, *Bibby Line* was actually at Sidmouth Junction in 76 min., 3 min. early, without exceeding 79 m.p.h., having climbed to Honiton summit at about 40 m.p.h. as on the previously mentioned run.

In the opposite direction, with a 13-coach 450-ton load, No. 35024 *East Asiatic Company* arrived in Waterloo before time, after averaging 60 m.p.h. up from Salisbury start to stop and 69 m.p.h. over 60 miles intermediately on a steadily good unchecked run.

On the Eastern Section a 28-year old King Arthur 4-6-0 No. 30769 *Sir Balan*, with 10 corridors, more than made up for a 9-min. late start on a moderately timed holiday train non-stop from Folkestone to



The photograph by W. S. Garth reproduced here shows "Duke of Gloucester," the B.R. prototype express 4-6-2, on what is thought to have been its first turn of duty north of Preston. The spotters on the station are obviously pleased with their capture.

London, providing running fully equal to that scheduled for the *Man of Kent*, the fastest express of its kind on the route, which with a similar load is usually worked by a light Pacific. This engine and crew were on one of the summer Saturday through turns from Victoria to Charing Cross via Ramsgate and Deal. No. 34076 *41 Squadron*, of the Battle of Britain class gave me the pleasure of recording the exact maintenance of a very tight 27-min. allowance from leaving Ashford to passing Tonbridge on an up morning Kent Coast express having 11 coaches, very full, weighing nearly 400 tons gross. The distance is 26.6 miles, and 75 m.p.h. was attained by Headcorn on a straight and nearly level stretch. Between Tonbridge and London the gradients become much steeper, as they are south of Tonbridge on the Hastings direct line, along which I have noted several good Schools performances, also through, to and from Charing Cross or London Bridge with speeds up to 80 m.p.h.

King Arthur 4-6-0 No. 30790 *Sir Villiers* hauled a return holiday train through from Portsmouth to Leicester recently via Basingstoke and Banbury on



A Manchester-Marylebone Express in Springwood Cutting, Huddersfield, on the occasion of the diversion of traffic via Huddersfield and Penistone owing to work in progress at Woodhead Tunnel. This and the companion view below are from the camera of Eric Blakey, Huddersfield.

to the former Great Central line at Woodford Halse. Two of the three electric locomotives on summer Saturdays worked Continental boat trains between Victoria and Newhaven and during the day took charge of through Midland trains along the coast from Hastings to Brighton or through to Redhill, via Lewes. I travelled behind No. 20002 on the latter duty when the load after attaching Eastbourne coaches at Polegate was 11 W.R. coaches, but there was little chance of displaying speed capacity on a busy day, with some late running. Many summer coastal trains were handled by 2-6-0s.

New class 5 4-6-0s numbered 73050-2 are stationed at Bath.

Eastern and North Eastern Regions

Construction of class 4 B.R. 2-6-0s has been continued at Doncaster. No. 76043 was ready early in August. Nos. 76035-43 are stationed at Neasden. Class 3 Moguls numbered 77010-4 built at Swindon were allocated to Darlington.

Darlington Works is constructing the smaller class 2 type, from No. 78028 upward, at the time of writing. Earlier ones of that series allocated to West Auckland and Kirkby Stephen are proving popular with the locomotive men and doing well over the high moorland summit of Stainmore, approached by a long climb, a reader reports. The class 3 standard engines it is understood may also work over that wild route to Westmorland though seen largely on trains from Darlington to Saltburn or Richmond, Yorks.

Class J2 became extinct when No. 65020 was withdrawn. This was of the G.N.R. 0-6-0 superheated, mixed traffic type.

New diesel shunting locomotives: 13128-31 were placed in service at Peterborough. The A4 Pacifics *Union of South Africa*

and *Gannet*, respectively operating from the Edinburgh and London ends, made many runs with the *Elizabethan* summer express. On a number of occasions they improved on the 60 m.p.h. overall timing for a 393-mile non-stop run, regaining lost time and sometimes arriving early.

As on other Regions the long distance traffic has been extremely heavy, especially on Saturdays, and the V2 2-6-2s have taken a considerable share in express passenger working with all classes of 4-6-2, while the B1 4-6-0s have been travelling far and wide, including excursion journeys far into L.M.R. territory and elsewhere.

Motive Power Changes on Manchester Route

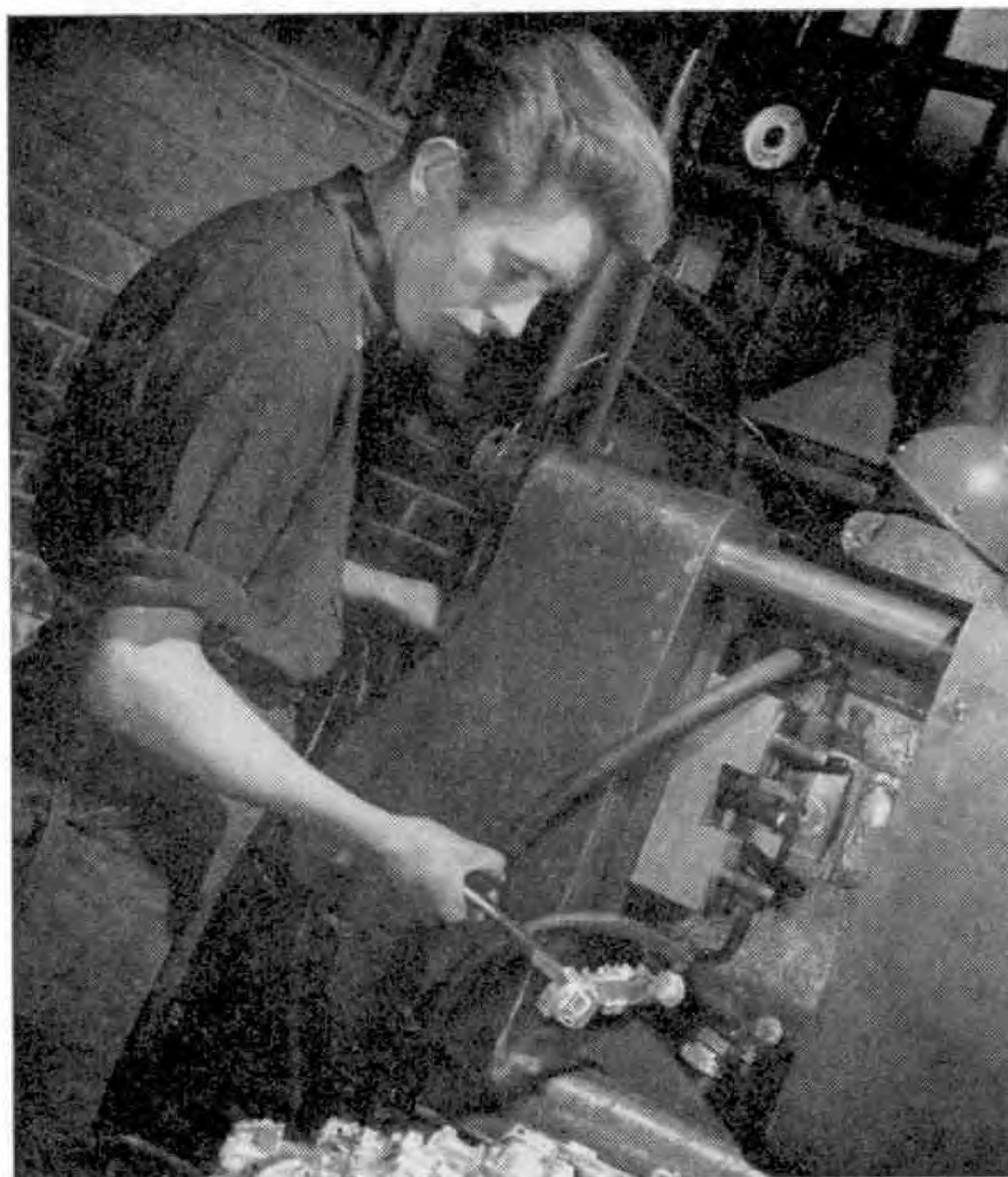
During the transition period from steam to electric propulsion over

the steeply graded Sheffield-Manchester main line, there have been some interesting examples of strikingly different motive power at the head of the same trains. Over the short distance from Manchester to Guide Bridge, for instance, A5 4-6-2Ts were noted a good deal in June on main line passenger trains; then came haulage by one of the 26xxx electric locomotives as far as Penistone, giving place there to a variety of tender engines working to Sheffield or beyond including B1, B16 and sometimes L.M.R. "5" 4-6-0s, J11 and J39 0-6-0s, etc.

Electric traction is gradually being introduced for all types of train between Manchester, London Road, and Sheffield, or Rotherwood in the case of freight. Freight trains to and from Wath are electrically hauled throughout. About 180 trains of all kinds are handled at Penistone daily. The opening of the new Woodhead Tunnel on this route was recently reported in these pages.



The second stage of the journey. A K3 2-6-0 No. 61966 is hauling a Manchester-Marylebone express on to the Penistone Branch at Springwood. The train has thus been reversed from its original direction.



Die casting the cab and chassis section of the Big Bedford Lorry, Dinky Toys No. 522.

THERE is no need for me to introduce Dinky Toys to you. Practically everybody in Great Britain knows them, as do millions in other parts of the world, for there can never have been toys that have had so much fascination for their owners.

Why Dinky Toys have sold in millions for many years past is easy to find. A mere glance at any one of them is sufficient to show that they are well made and beautifully finished, and it is now well established

that a Dinky Toy is almost indestructible. Its enamel may suffer a little from really harsh treatment, but the toy itself will retain its shape, even if its owner jumps on it or hits it with a hammer—provided of course that he does not use a steam hammer or a giant hydraulic press, or exerts the power of a Samson!

So there are two reasons for being interested in how Dinky Toys are made. One is the attractions of the toys

with of course the wheels, axles and cab base in addition. Both the cab and chassis and the body are die cast, which means that they are made by forcing molten metal into a mould, or die, that gives the metal the required shape when it cools and solidifies.

This sounds simple. You just make a mould of the right shape, pour in the molten metal, let the mass cool, and

there you are!

Actually the whole process is far from being as simple as that. To begin with, the

die must be made with the utmost accuracy in order to give a product that is of exactly the right shape and size. This means careful and patient work on the part of the toolmaker who is responsible for the production of the die. In the second place, the die requires the utmost care in design. In general, it is made in two main sections, which can be slid together so that between them is the space that the molten metal is to fill.

How Dinky Toys are Cast

By the Editor

If the part to be cast is just a slab or disc, or something equally simple, then the die can easily be opened when the metal forced in has cooled, so that the casting can be taken out.

But just look at the cab and chassis of your Big Bedford, and you will soon realise that the maker could not just pull apart the two halves of the die in which this is made while the casting is in it. The reason for this is that there are recesses or undercuts on the casting, into which parts of the die fit, so that the two sections cannot be separated from each other, and the casting taken out, unless something is done to allow for this.

And something of course is done. In these cases the die is not actually made in just two sections. One of the sections has parts that slide out sideways when the two sections are pulled apart, to clear the casting and permit its ejection from the mould.

How this is arranged can be seen at a glance from the accompanying picture of the two parts of the die that produces the Big Bedford chassis. When these are placed face to face, metal injected into the space between the two sections forms the casting that you can see pictured in the same illustration. Above and below this space in the right-hand die are two sections designed to slide out sideways when the die is opened after casting. In each of these side jaws or slides two holes are bored, and into them fit the angled dowels, or spigots, opposite them that can be seen in the

left-hand section. These slope outward at such an angle that the side jaws slide outward as the mould opens, far enough to take them clear of the casting.

With this particular model there are actually three sliding sections, the third being an end jaw or slide shown on the left of the moving half die, with the corresponding dowel on the right of the fixed half die.

Suppose that a die, such as the one illustrated, has been made from tough steel, by careful machining, filing and polishing, and it is now to be used for actual die casting. For this the two sections of the die are mounted in a die casting

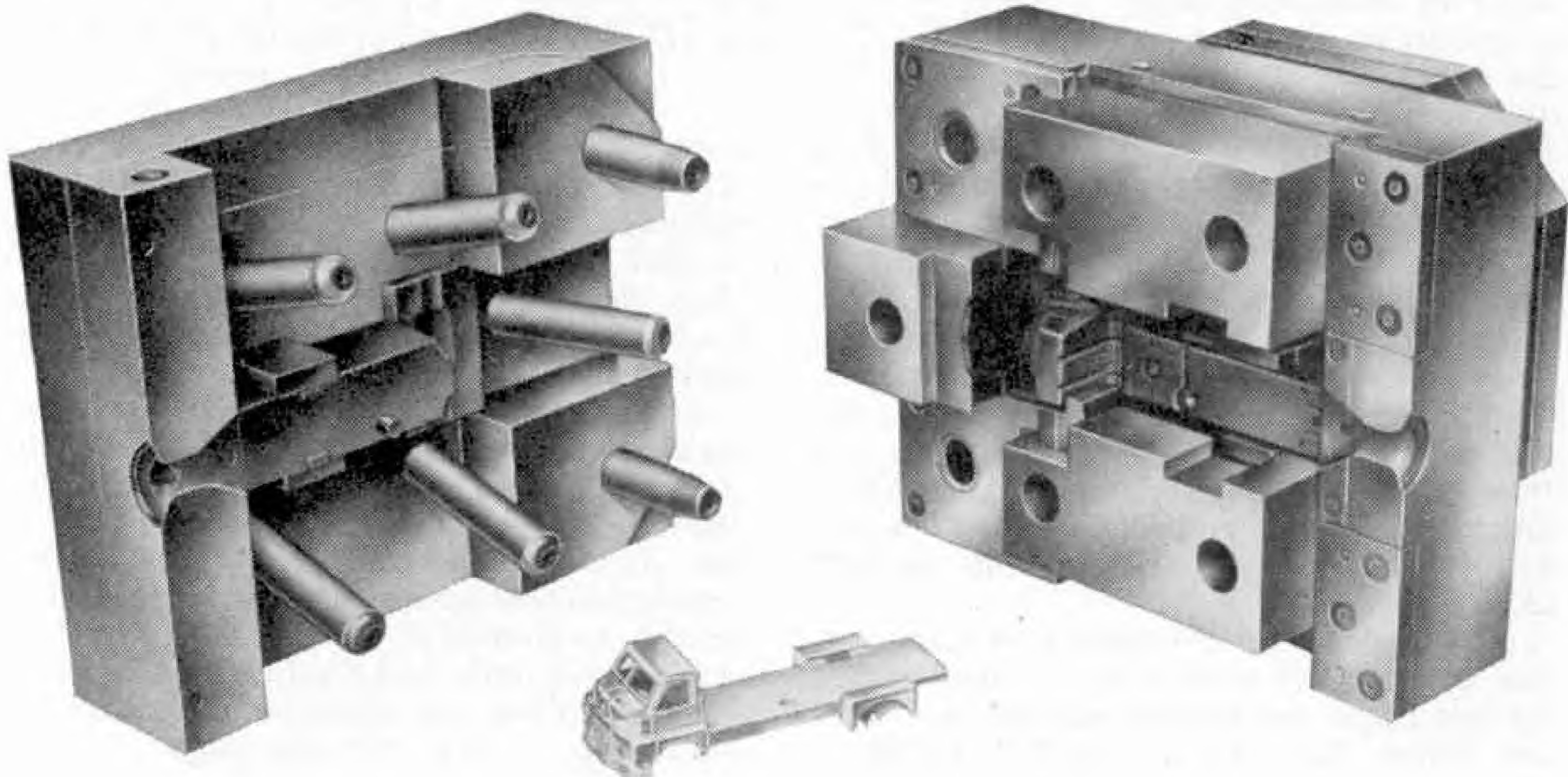
machine. One of them is bolted to the fixed platen of the machine. The other is mounted on the moving platen, also part of the machine. This platen can be moved horizontally to close the

two half dies, as of course it must do for casting.

This is clearly shown in the fine illustration on the opposite page, in which an operator is seen lifting out a casting of the Big Bedford cab and chassis that has just been made. One of the two sections of the die can be seen mounted in position; that is the fixed one. The other slides in from the right at the movement of a lever that brings the two half dies together. A plunger operated by compressed air then forces molten metal from the cylinder into the die, where it fills the space between the two sections.

The metal solidifies almost immediately,

At the foot of the page are seen the two halves of the die in which the Big Bedford cab and chassis section is cast. In front of the dies is an actual casting from them.





One of the die casting bays at the Speke Works of Meccano Ltd. is seen in the illustration at the head of this page.

chilled by the large mass of metal in the die, which is cooled by water flowing through openings bored through it. The rubber tubes through which the cooling water circulates through the die can be seen in the illustration on page 474. On opening the die by sliding the moving part outward the casting is ejected. Although no longer molten, the metal of course is still hot—so the operator takes the greatest care to lift out the casting only with tongs or pliers.

It does not take long to produce a casting, but that is because time and labour have been freely devoted to making the die, which must be accurate to the finest limits in order to make sure that it produces castings of the exact size, shape and quality required for Dinky Toys. In the die casting machine special care too has to be taken to ensure that the two sections of the die are exactly in line, so that they fit together perfectly while casting is in progress. To make sure of this there are guide pillars at right angles to the faces of the die sections that are to meet, with holes in the moving part of the die into which these pillars slide. In the die from which the Big Bedford is made there are two of these guide pillars, which can easily be distinguished in the picture of its sections.

The bays of the die casting department, one of which is shown in the illustration on this page, are fascinating places. They are warm, too, for to each machine is

attached a "pot," which in spite of its name is made of cast iron, that holds the molten metal from which Dinky Toys are cast. It is heated by pressure gas flames, blue like those of a Bunsen burner, that keep the metal molten, and the supply is renewed from time to time by putting in the pot another ingot of metal. This replaces the metal used as the casting process continues.

The operation of a die-casting machine is generally controlled by the use of two levers, which are interlocked to prevent metal being forced through the nozzle when the dies are apart. When the first lever is operated, the slide carrying the moving half of the mould travels forward till it is in contact with the fixed half of the mould. At this point the interlock is operated automatically to permit movement of the second lever, which actuates the plunger that forces metal into the mould. The plunger is then raised, the mould is opened and the casting ejected.

Actually rather more than the casting wanted comes out, for attached to it is the "runner", which is metal from the opening through which the molten metal enters the die. In the die illustrated on page 475 the position of this opening can be distinguished on the outer ends of the two sections. How this is dealt with, and the further treatment of Dinky Toys, are explained in the article beginning on the opposite page.

More About Dinky Toys

From Casting to Packing

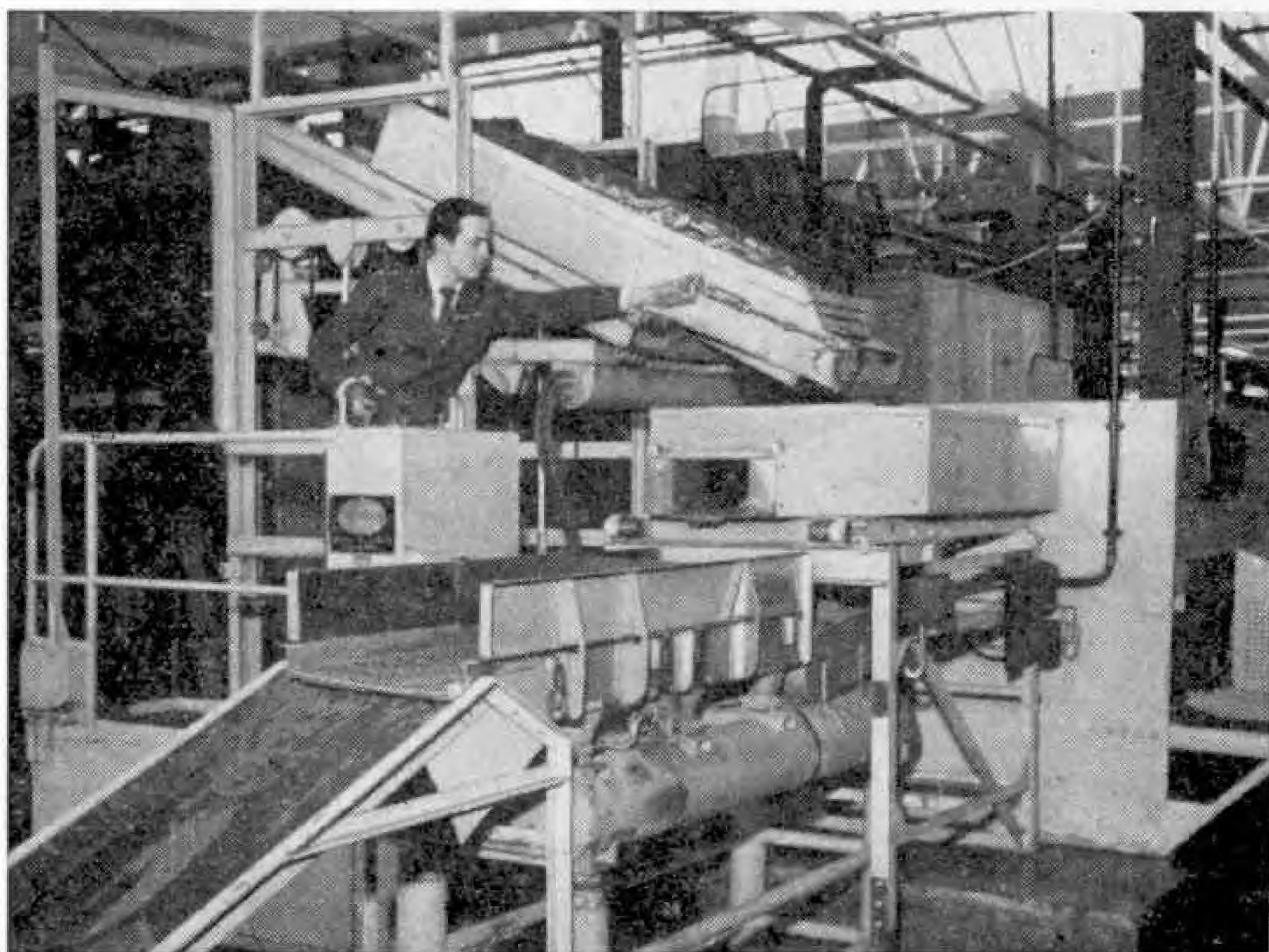
By the Editor

IN the article on page 474 I took the story of the making of a Dinky Toy as far as the production of the casting. You will remember that the casting emerging from the die has attached to it a runner, consisting of metal from the opening through which the molten metal is forced into the die, with a slight amount of flash caused by the joint lines of the mould. The runner is easily broken off, but flash cannot be removed in this way. So the castings are given what at first sight seems rather drastic treatment. They are rotated in large six-sided barrels, made of steel and rubber lined, with

to its lowest point. This time the castings fall out, accompanied of course by the pebbles.

No handling is involved in the Roto-finish process, as this treatment is called. Alongside the line of barrels runs an electrically-driven trolley, which has on it a tray that can be raised or lowered, moved forward or backward, and may also be tilted to any angle up to 45 degrees. It is placed above the barrel when this has to be charged, and is tilted to cause the castings to fall into the barrel through its narrowed outer end. When the Dinky Toys are to be taken out of the barrel,

the tray of course is placed horizontally underneath to receive the smooth cast-



Delivering Dinky Toys castings, after treatment in the Roto-finish plant, to the separator. In this the Dinky Toys are separated from the pebbles that are used to remove flash from the castings.

ings and the pebbles.

The operator of the trolley, riding on the platform where the control levers are placed, takes

quantities of small pebbles and water. At the Speke works of Meccano Ltd. there is a battery of such barrels, arranged in line.

As the barrel with its contents rotates the pebbles rub on the castings and wear off the flash. Then the cover of the opening in one side of the barrel is replaced by one with a small mesh and the barrel is turned so that the water flows out. The barrel is then rotated to bring the cover uppermost. This is removed and the barrel is again turned to bring the opening

the load to a special plant where the castings are separated from the pebbles. This plant is at the end of the line of Roto-finish barrels. The tray full of castings and stones is raised, moved forward and finally tilted, so that its contents are delivered into the receiving tray of the separating plant. It is then withdrawn, lowered and placed in position farther along the plant, where later it will receive the stones after separation.

All is now ready for this process. The receiving tray of the separator is tilted,

so that Dinky Toys and stones together fall on a wire grid, the mesh of which is too small to allow the Dinky Toys to fall through, but large enough to permit the stones to pass. The grid is vibrated rapidly forward and backward, so that the Dinky Toys and stones run along it. The stones do not get far before they fall

undergo. In this they are Bonderised, which means that they are treated with a phosphate solution that gives protection against corrosion and also etches their surfaces slightly, so providing a key for the coating of enamel.

Let us follow the progress of Dinky Toys through this treatment. The plant

in which it is carried out is large and impressive, as can be seen from the illustration on this page. Here again the castings are loaded into six-sided barrels, but these are smaller than those of the Roto-finish plant, and differ also in that they are made of stainless steel and have perforated sides. The barrels are carried on an endless chain that takes them, empty, along the top of the plant, and carries them downward at the feeding end. There Dinky Toys from the separator are placed into each in turn. The charged barrels then pass under the plant, where they are dipped successively into three tanks. In the first is the Bonderising liquid, and the second and third contain cold and hot water respectively, which washes the castings. The chains then carry the barrels upward and through an oven heated by gas in which they are dried. Each barrel is opened on reaching the delivery end of the plant, and from it the Dinky Toys, now Bonderised, washed and dried, fall on to a conveyor



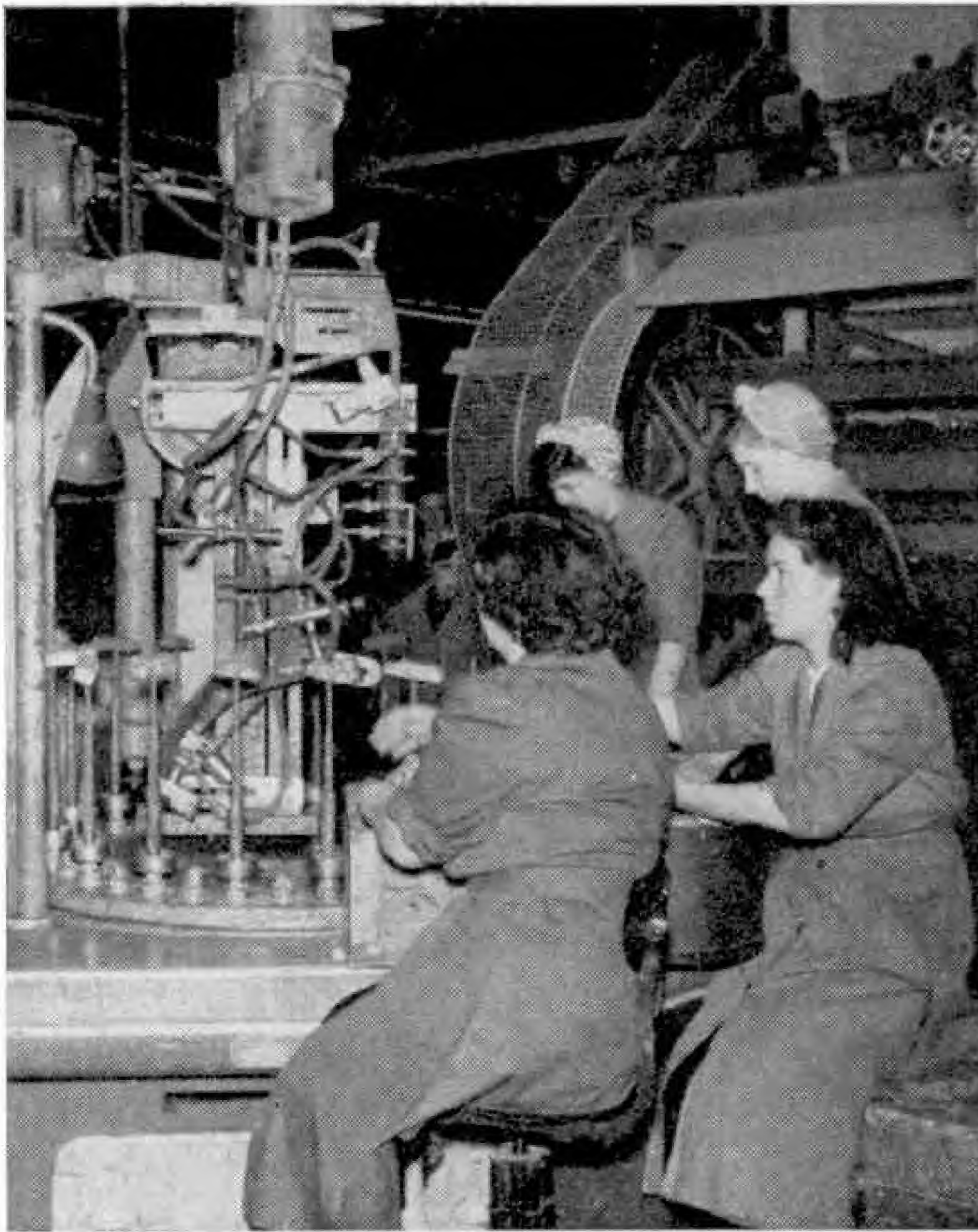
The delivery end of the Bonderising plant. Dinky Toys that have been Bonderised can be seen on the conveyor belt in the right foreground.

through the mesh and are delivered into the conveyor tray of the trolley. The Dinky Toys pass over the full length of the wire grid, and from its end are delivered into containers that carry them forward to the next treatment. The stones of course are taken by the trolley back to one or other of the Roto-finish barrels, to deal with a further batch of castings.

The Dinky Toys castings are now clean and smooth, and at first glance look quite ready for enamelling—apart of course from the fact that they are wet. But to make sure that the coating of enamel that is given them will be very firmly attached they have yet another treatment to

belt that delivers then into containers, for carriage to the next stage of their production.

Careful inspection follows in order to make sure that each casting is absolutely perfect before it goes on to the spraying process that gives it its attractive appearance. This process is carried out chiefly on machines, one of which can be seen in the upper illustration on the next page. A circular table has around its rim a series of equally spaced pillars carrying holders. The castings from the Bonderising plant are placed on the holders, the table in the meantime rotating in stages. These stages bring each casting in turn into the spraying



Spraying Dinky Toys on an automatic machine. In the background is one end of the rotary stove in which their enamel is dried and hardened by baking.

of 200 deg. F., which dries and hardens the coating of enamel. When they emerge at the far end of the oven, over 30 ft. away, the sprayed castings are cool and their enamel is capable of standing up to hard wear.

This is not the finish of the enamelling process. What has been applied in the spraying machine is the basic colour, and many Dinky Toys require a second colour, perhaps covering such parts as radiators and lamps or perhaps in the form of a flash. For applying this special means are employed. Take for instance our Big Bedford Lorry. On the front of the cab are the radiator grille and representations of the headlamps, which have to be sprayed aluminium colour. For this a special mask is used, in which there are two holes of exactly the same size as the lamps, and the correct distance apart, and a larger opening for

the grille. The sprayed casting is placed behind this mask, which carries guides to ensure that it is placed in exactly the right position, and a touch of aluminium spray from a hand spray gun then applies the necessary coating, which the mask restricts to the radiator (Continued on page 469)

position, and while it halts there spray guns move towards it, to coat it evenly and finely with enamel. The holder and the part itself rotate rapidly at this point to ensure that every bit of its surface receives its coating of enamel. As the castings move on with the rotation of the table they are lifted off and put on trays, which are immediately placed on racks at one end of an immense drying oven. This end can be seen in the background of the picture of the spraying machine. By means of an endless chain travelling over sprocket wheels, the trays are then carried slowly through the oven, in which they reach a temperature

the grille. The sprayed casting is placed behind this mask, which carries guides to ensure that it is placed in exactly the right position, and a touch of aluminium spray from a hand spray gun then applies the necessary coating, which the mask restricts to the radiator (Continued on page 469)



Mask spraying of Dinky Toys.

BOOKS TO READ

"THE NORTH EASTERN RAILWAY"

By C. M. JENKIN JONES (British Railways 2/6)

Britain's former independent railway companies inspired great loyalties. To this can be ascribed the appearance of this centenary story, for the author was himself a former officer of the North Eastern Railway and later was General Manager of the area it controlled when the railway company itself was merged in the L.N.E.R.

The North Eastern Railway was a grand provincial monopoly, but unlike most monopolies it was popular in the area it served so well.

The men who built up the company, and those who later guided its fortunes, naturally take an important place in the story, but characteristic activities, plant, equipment and working methods are briefly described as well. Maps of the system at its origin in 1854, and at the time of its incorporation in the L.N.E.R. show how it developed in its 68 years of independent life. The other illustrations are well varied, and in particular bridges and locomotives, both strong points in North Eastern equipment, making a good showing for a publication restricted to 30 pages. This is well printed and will appeal to genuine railway enthusiasts everywhere, as well as to those specially interested in its subject.

Copies of the booklet can be obtained from the principal bookstalls, bookshops and stationers, or by postal application through the Public Relations and Publicity Officer, British Railways, N.E. Region, York.

"CARGOES OF THE GREAT LAKES"

By MARIE MCPHEDRAN (Harrap 10/6)

Here is all the romance of the Great Lakes, that series of five "inland seas" in the course of the mighty St. Lawrence River.

Four of them form a boundary between Canada and the United States, and the fifth—Lake Michigan—is wholly within the U.S.A. Day and night, from the time the ice breaks up in the Spring until the onset of Winter, the Lakes are dotted with freighters engaged in an immense traffic between the Lake ports of the two countries, carrying grain, cement, coal, oil and pulpwood and many other commodities.

In this book the interesting experiences of two boys who are privileged to voyage on some of the Great Lakes freighters give the readers a fascinating insight into this vast seasonal trade and into the life of the men aboard the ships. All the facts and figures given are authentic and up to date, as are the maps and charts, and the neat little drawings that illustrate details of the ships, ports and docks concerned.

"ATHLETICS FOR BOYS AND GIRLS"

By J. EDMUNDSON and C. R. E. BURNUP
(Bell 10/-)

The popularity of track and field sports has been heightened by the record-breaking achievements this year of Roger Bannister, the first man to run a mile in four minutes, and Freddie Green, who recently created a new three-mile world record, his time for the distance being 13 min. 32.2 sec.

Previous books on athletics for beginners have been mainly written for teachers, but here is one written and illustrated for young athletes themselves, both boys and girls. An introductory chapter tells them how to keep fit, how to find the type of track or field sport for which one is best suited, and what equipment to get. Successive sections deal with running, jumping

and throwing, and in each case the detailed story of the physical action involved is made more effective by the use of neat little diagrams showing the correct poise, movement and so on. By following the advice given, the athletic student can be sure that he is training on the best possible lines.

The final section of the book deals with taking part in athletic competitions; gives a useful glossary of common athletic terms, and lists tables of standard attainments by which the reader who tries to follow out the authors' schemes can measure his progress. The eight half-tone illustrations show track and field sports winners in action.

"ADVENTURE OF THE WORLD"

By JAMES FISHER, M.A. (Rathbone Books)

The fascinating story of the world, from its formation millions of years ago down to our own time, has been told often before. Here it is presented in a new way, in which the purposely brief text is supplemented by series of diagrammatic coloured drawings that have the effect of making the reader vividly aware of the greatness and drama of the story that is told.

We see the progress of the world shaped by wind, rain and ice, followed by the growth of vegetation and the arrival of animals. Finally man takes over, agriculture begins to replace the vast primeval forests with open fields, and cities are created and linked by roads. Exploitation of the immense natural resources of the Earth increases to meet the ever-growing demands of civilisation, travel by air is added to

means of transport by land and sea, and man even begins to look beyond the Earth and to dream of conquering space.

The story is well illustrated. For the first time in publishing history, shadow relief maps giving a 3-dimensional effect are included in the text, and their beauty and vividness, enhanced by the outsize pages of this book, make them outstanding among the wealth of illustrations.

Adventure of the World is available in a cloth-bound edition at 10/6, and a de luxe, cloth-bound one at 14/-.

"RAILWAYS OF THE WEST MIDLANDS 1808-1954"

(The Stephenson Locomotive Society 7/6)

A glance at the map shows the area broadly known as the West Midlands to be covered by a network of intersecting and connecting railways, many of them pioneer lines, and even before these came into existence there were various preliminary schemes and surveys.

So this S.L.S. publication makes an early start, the first entry relating to 1808. It aims to provide a reasonably complete and detailed record of historical events on public railways in the area covered. To the enthusiast it is more than a mere chronology or work of reference. Stations affected by this or that development are named, and train services and certain working arrangements are referred to briefly when necessary. In addition there is a good selection of illustrations, some reproduced from early views and others showing more recent developments. Finally, to complete one's enjoyment of the book there is a separate folding map.

It may not be realised that the Stephenson Locomotive Society does not confine its interest to locomotives alone. All aspects of railway activity appeal to the Society as a whole. Copies are obtainable at 7/9, including postage, from Stephenson Locomotive Society Publications, 35 Hampton Court Road, Birmingham 17.

On these pages we review books of interest and of use to readers of the M.M. With certain exceptions, which are indicated, these should be ordered through a bookseller.

"MILITARY AIRCRAFT OF THE WORLD"

H. F. KING, M.B.E.

This is a reprint of the annual review of military aircraft published in the weekly aeronautical periodical *Flight* of 25th June last. It covers the complete range of shore-based and ship-borne aircraft demanded by modern war, ranging from fighters—of which there are five classes—to tactical and strategic bombers, ground-attack and reconnaissance aircraft, various types of ship-borne aircraft, and training aircraft.

Many of the numerous illustrations appear for the first time, and a special feature is a spread of drawings showing, to a uniform scale, the world's jet bombers. These drawings reveal the astonishing diversity of design of present-day aircraft, ranging as they do from the crescent-wing Victor and delta-wing Vulcan to the giant Boeing B-52, with its eight turbojets slung beneath its vast sweptback wing.

Military Aircraft of the World can be obtained through any bookseller, price 2/6, or direct from the publishers, Hiffe and Sons Ltd., Dorset House, Stamford Street, London S.E.1, price 2/10 including postage.

"TEACH YOURSELF INDOOR AQUARIA"

By D. LATIMER-SAYER

(English Universities Press 6/-)

A well-maintained indoor aquarium is an attractive sight, and it is not surprising that this most interesting hobby has come back into favour during recent years. An aquarium of this kind is not difficult to build and look after, and amply repays the careful attention given to it.

This excellent book has been specially written for the beginner. It explains in great detail what equipment one needs and, having obtained it, how to construct one's own aquarium, heat it and maintain it in proper condition. The stocking of the tank is gone into very fully, both as regards suitable types of fish and the best kind of aquatic plants to instal. The many different species of exotic tropical aquarium fishes are described, as also are the types of cold water fishes suitable for indoor aquaria. On the maintenance side, the author describes various kinds of marine life that help to ensure clean and healthy conditions in the tank.

Later chapters deal with fish foods and feeding, breeding procedures and habits, and how to deal with the troubles and ailments that occasionally disturb the occupants of even the best-regulated indoor aquarium.

The book is illustrated with almost 100 excellent line drawings of equipment, types of fishes, etc. It is a pity, however, that some at least of the fish illustrations are not in colour, as it is impossible by word and line drawing to convey the fairy-like beauty of colour of these tiny, fascinating creatures.

"ABC OF LONDON TRANSPORT"

Compiled by E. J. SMITH (Ian Allan 2/6)

This popular handbook, now in its tenth edition, lists all the London transport buses in service, giving both their fleet and registration numbers. There are technical details of each type, and identification notes will enable the enthusiastic spotter to recognise any vehicle immediately. As usual, there is an excellent supplement of half-tone illustrations of the types of vehicles now being operated.

"CHINA TEA CLIPPERS"

By G. F. CAMPBELL, A.M.I.N.A.

(Adlard Coles 6/6)

The fine wooden-built sailing ships of the 19th century have been superseded on the high seas by fast modern steel-built, freight liners, but the "old timers" are still a subject of great interest to veteran seafarers, ship lovers and shipmodellers. The sailing ships of the Honourable East India Company, which long held a monopoly of trade with China, were fine examples of these craft, broad of beam, with bluff bows and complicated rigging. As competition increased, particularly for the China tea trade, faster clipper ships with finer underwater lines, came into service.

In this neat little book the author first tells briefly the history of these famous clipper ships, and then deals with their actual construction. He describes the different types of sail plans that were adopted, hull construction, steering gear, windlass and fore-castle arrangements, and supplements his notes with neat, sectional line drawings. There is a final set of drawings dealing with miscellaneous details such as headboards, figurehead, compasses, boat crutches, stern decorations, types of deckhouse, etc. Scale plans for a typical model clipper ship, which the author has named *Foochow*, also are included.

"THE IRISH MAIL,"**"THE GOLDEN ARROW" and****"THE RED DRAGON"**

By ALAN ANDERSON

(Brockhampton Press 2/- each)

For most of us it is impossible to make as many journeys on important long-distance trains as we should like. The next best thing is to read about them, and we are all glad to read such stories before we make the actual journey described, so that we can know what to look out for. That is where such little books as these are useful. They are attractively produced, with plenty of illustrations, and with them we can follow the run of the trains, on either a real or an armchair journey, on pictorial sketch maps of the routes and gradient profiles.

The *Irish Mail* and the *Golden Arrow* booklets are slightly more ambitious in scope than others in the same series, as they deal with the continuation of their services overseas. So the *Irish Mail* takes us through to Dublin by way of the mail boat to Dun Laoghaire and C.I.E. train to Amiens Street. The *Golden Arrow* journey takes us across the Channel in the *Cote d'Azur*, and then we sample French railroading from Calais to Paris in the sumptuous *Fleche d'Or*, which provides the Continental counterpart of our Southern *Golden Arrow*.

"THE MAP UNFOLDS"

By C. MIDGLEY, M.Sc. (Wheaton 3/-)

This is the third in a series of handbooks on map reading and map making, the earlier ones in which—*The Magic Map* and *Look at the Map*—dealt with such items of map reading as may be acquired indoors. It is primarily intended to encourage the use of maps out-of-doors, and will be of value to youth organisations that include rambling, hiking, cycling or climbing among their activities, and, of course, to the reader who likes doing these things "on his own".

The author explains the mysteries of the symbols and contour lines seen on Ordnance Survey maps, and a section of such a map is inserted at the end of the book. Readers learn how to ascertain quickly the exact location on a map of a particular place or landmark, how to draw a large-scale map, how to make a map from an aerial photograph, how to use a compass, and so on. The book is liberally illustrated with half-tone pictures and coloured diagrams.

The Map Unfolds is published by A. Wheaton and Co. Ltd., Exeter, but can be obtained through any bookseller.

"WOOD TOY MAKING, BOOK 2"

By W. A. G. BRADMAN (Foyle 2/6)

Readers who like working with wood will find in this handbook clear working directions, with excellent dimensioned and sectional drawings, for the construction of an interesting selection of toys for children. All the subjects are proved favourites with youngsters, and include indoor, garden and mobile toys. Particularly welcome is a very useful chapter on wood bending, as although few bent parts are employed in the construction of the toys chosen for this book, their making would be difficult were it not for the fact that bending can be done by processes that are simple enough for any handyman to tackle. Another good thing is that the author quotes sources of supply for small but important parts, such as self-locking nuts and metal parts for a toy motor car.

Adventures with a Camera

Photography on the Somerset and Dorset

By H. Gordon Tidey

THE search for "fresh fields and pastures new" found me this year visiting the Somerset and Dorset line, which has come so much into the limelight recently after being almost entirely neglected for so many years. I decided to make Shepton Mallet my headquarters. The section of line from Evercreech to Bath is far more interesting than the southern end, and I figured out that in my car I should be able to reach a number

of spots to which I had been recommended between Evercreech Junction and the south end of Coombe Down Tunnel, Bath, with comparatively short waste of time in travelling. Western Region, west of Newton Abbot. Generally speaking, it rises to a main summit over the Mendips and as, for reasons of economy, it was laid out with as little engineering work as possible, it abounds elsewhere in short but steep gradients. As for curves—well, they are continuous almost throughout the system. In addition, starting from Bournemouth, there is single line from Broadstone to Corfe Mullen Junction, and from Blandford to near Templecombe.

Northward from Evercreech Junction the gradient starts very soon at 1 in 50 and continues to the

Ex-Midland rebuilt 4-4-0 No. 40509 helps B.R. Standard class 5 4-6-0 No. 73052 past Chilcompton with the "Pines Express."

summit at Masbury, after which the line descends steeply to Radstock. From there, gradients continue steep, though short, both up and down

until, shortly after passing Midford, Coombe Down Tunnel is reached. The approach to Bath through Devonshire Tunnel is at 1 in 50 down. From Midford the line is once more single.

Such formidable obstacles quite prevent anything in the nature of really fast running, let alone recovery of lost time, and at summer week ends, with many extras and trains in duplicate, the line is hard put to it to cope with the traffic, aggravated as matters are by the single line sections.

On the morning after my arrival, which gave promise of at least some sunshine, I made for Wellow, at the northern end of the line, where I obtained nice shots of a goods in each direction, hauled by the late S. and D. J. Rly. 2-8-0s, and a down local in charge of a Midland 4-4-0 of Class 2. Then I proceeded a bit further north, to



of spots to which I had been recommended between Evercreech Junction and the south end of Coombe Down Tunnel, Bath, with comparatively short waste of time in travelling.

A short study of the timetable of this line will show that the line could well be described as a "Saturday only" railway as, with the exception of the *Pines Express* and some stopping trains, there is really very little except goods during the rest of the week. But on Saturdays there is a very different picture, as I shall show. On Sundays the line only provides one stopping train in each direction, but during the summer there is an excursion to Bournemouth. I joined this. It was well filled, hauled both ways by Standard Class 5 No. 73052 and made up to 10 coaches.

I imagine that this line presents work for locomotives on a par with that of the

near Midford, where I got several more, including the down *Pines Express*. On the Thursday I tried my hand a little further south, finding a nice spot near Chilcompton, where I again got the down *Pines* and several others.

Next day I found another useful spot at Old Down, again a

A stopping train headed by L.M.R. class 2 4-4-0 No. 40697 enters the picturesque wayside station of Cole on what is now the S. and D. section of the Southern Region.



little further south, but here I had difficulty in getting to the line, because I found a well populated chicken farm, having the usual horizontal wire fence on both sides, but in addition wire mesh almost to the top.

This of course was no deterrent to the chickens, who, by the simple expedient of flying to the top and jumping down were able to parade up and down the track in full force. As I am not in any sense a chicken, it became a problem how to get over this fence. I finally overcame the difficulty by using the camera case as a step, sitting on top of the three-sixteenth inch wire, and throwing my legs over before the agony became too acute, only to find I was unable to reach the camera case over the top of the fence. I had to edge it up inch by inch, with my fingers

through the mesh and when I got it nearly half way I dropped it. Luckily it did not fall out of reach. There is one consolation about the Counties of Somerset and Dorset—they do not appear to have

succumbed to the temptation to use barbed wire for their fences.

On arriving in a more or less exhausted condition on the lineside, I was at once surrounded by an army of voracious fowls, all under the impression that my sole purpose in being there was to provide them with a meal.

Unlike most lines, the Somerset and Dorset has no large increase of traffic on Fridays, except for a few downs in the early evening. But the Saturday I had looked forward to, for on that day the line is taxed to capacity. Arriving betimes at Evercreech Junction, I noted four Class 2 locomotives, one of which was originally owned by the Somerset and Dorset—it had the low-sided tender. These were pilots

waiting to assist the West Country or Standard Class 5 engines that would bring the succession of heavy expresses from Bournemouth. These are attached here for the gruelling



One of the familiar Derby 0-6-0 class 4 freight locomotives is seen here on a mixed freight train near Masbury summit.

climb ahead, usually going right through to Bath, balanced by a return working on the equally gruelling start from Bath.

On a Saturday these trains from Bournemouth arrive at Evercreech Junction at intervals of about 15 minutes from about 10.30 until 12.30, and as the line is not provided with water troughs, their engines take water while the pilot is being attached. I had of course hoped for sunshine, but the sky was covered with heavy low clouds threatening rain. Fortunately my intention was to confine my activities to shots at or near the station, so I was able to give ample exposure, and

Another pleasing scene near Masbury summit, showing an up freight train in charge of one of the "natives" of the 2-8-0 class built specially for S. and D. duties at Derby in 1914.

during the morning obtained a number of quite successful shots.

At night I was faced with the business of plate changing. In my hotel in Shepton Mallet, my bedroom was comparatively dark after the light in the street outside had been dowsed, at about 11.30, and was provided with a roomy wardrobe. I was therefore able to accomplish this in comparative comfort. On a trip like this, one of the trials of a photographer is the element of doubt regarding the facilities for plate changing.

Being now reloaded, on the Monday I made my way to Binegar Station, where I made the acquaintance of the Stationmaster, who showed me an excellent batch of results sent him by a brother photographer. At this pretty little countryside station I got good shots of a goods train in each direction, the up *Pines* and the downs from Bristol and Birmingham. Continuing my pre-arranged programme after a hurried snack lunch—one never has time to worry about meals on these jaunts—I reboarded the car and went to Evercreech New. This again is a very pretty little countryside station in beautiful surroundings, as is the case with all these ports of call on this interesting line, and there once more I got

the down *Pines* and several stopping trains.

My time was now getting short and on the Tuesday morning I again proceeded to Masbury summit, where I obtained two nice shots of goods trains and later, transferring my activities to Chilcompton, I made yet one more shot, last of the *Pines*. Despite the summer weather of 1954 I have been fortunate enough to shoot this crack train, often in both directions, in almost every spot I had pre-arranged.



Taken all round I found this trip of more than usual interest, far more enjoyable indeed than if I had once again visited one of the main trunk lines, where I already have so many records. As regards weather, the first three days gave the best results, although with the invariable luck of the Railway Photographer, I had several times to cool my heels for an hour or more in unbroken sunshine, only to find that as the signal came off the sun promptly made its exit behind a black cloud, appearing again as the train receded. In all my years of experience I have become so reconciled to this that now I invariably set my exposure for such conditions, quite irrespective of what is happening at the moment. During my morning at Binegar the Stationmaster actually commented on the fact that out of four exposures, this actually happened three times.

When I eventually arrived home, I did not feel too happy as to the results I had achieved. This misgiving I might well have saved myself, however, for my pictures proved much better than I had expected.

How Water Turbines Work

Electric Energy from Running Water

By R. N. Hadden

FOR many hundreds of years men have used water power to help them in their everyday work. The earliest machine evolved to convert the energy of flowing water to mechanical power was the well-known water wheel, which can still be seen working in many places.

The waterwheel, while producing all the power that could conveniently be used at any given situation did not, in many cases,

decrease of speed. Thirdly, it could not deal with a very large quantity of water without becoming unduly large. Lastly, it could only deal with heads of water up to about 20 to 30 feet. "Head" is the engineering term denoting pressure, a head of 1 ft. being roughly equal to about $\frac{1}{2}$ lb./sq. in.

To overcome these difficulties modern hydraulic turbines were developed. They

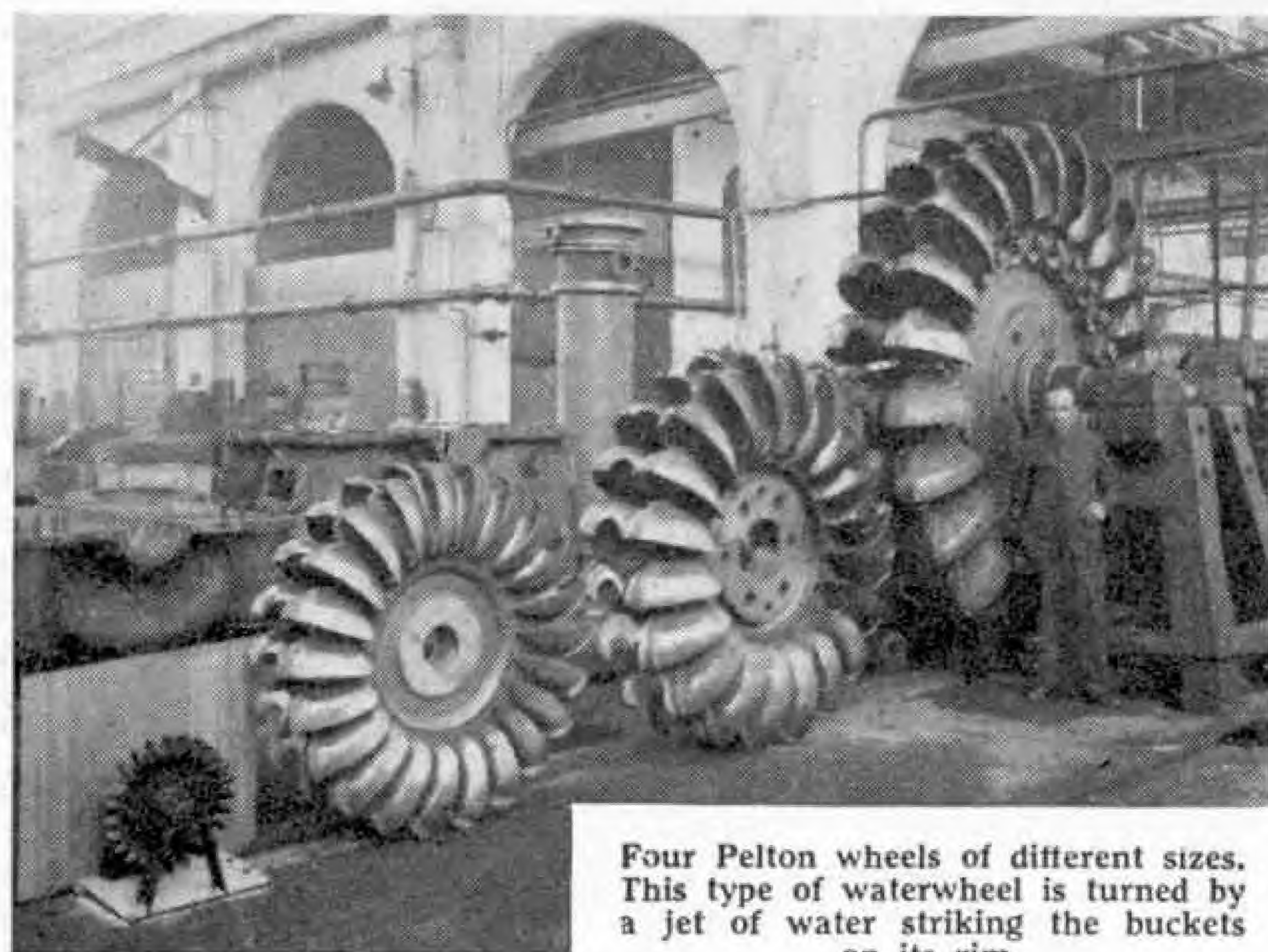
are extremely efficient machines, most of them making use of 80 to 90 per cent. of the original power available. Other advantages are that their running speeds are fairly high, thus permitting the use of small and hence comparatively cheap generators. Also turbines can be constructed to deal with quantities of water from a few cubic feet per second up to many millions of cubic feet, and heads from a few feet up to several thousand.

For various duties two different types of turbine are used. These are impulse turbines and

reaction turbines. Impulse turbines are used for high heads and small quantities, and reaction turbines for low or medium heads and very large to small quantities of water.

The impulse turbine is the simplest type in principle. It employs a jet of water that impinges on a series of "buckets" fixed to the rim of a wheel. The force of the water hitting the wheel causes it to rotate, thus producing power.

The most common type of impulse turbine is the Pelton wheel. Four Pelton wheels of different sizes are illustrated on this page. In the Pelton wheel, water enters through a curved branch pipe and flows past what is called a spear valve to the nozzle. The spear valve is very carefully designed so that it not only controls the quantity of water flowing,



Four Pelton wheels of different sizes. This type of waterwheel is turned by a jet of water striking the buckets on its rim.

use even a fraction of the total water power available. But with the development of the electric generator it became possible to convert the energy of the water into electric power, which could then be transmitted over long distances. Thus it was desirable to design machines that could make use of much more of the energy of the water at the chosen site.

Useful as the waterwheel was in the past to produce a limited amount of power, it suffered from four great disadvantages where electric power generation was concerned. These drawbacks were firstly that efficiency was very low, due to water spilling out of the troughs as the wheel rotated. Secondly, the speed of rotation of the waterwheel was much too low to drive an economical generator, as the cost of a generator increases greatly with the

but also ensures that the jet issuing from the nozzle is at all times well formed and solid. The opening of the spear valve itself is controlled either by hand, in the smaller sizes, or by an oil servo motor in larger sizes.

The jet of water issuing from the nozzle strikes the wheel buckets in the centre and is divided into two streams by a knife-edged "cutwater." This arrangement ensures that there is no sideways thrust on the wheel. The water leaves the bucket at a slight angle to the plane of the wheel, so that it just clears the back of the following bucket. It then drops down through the bottom of the turbine casing to the "tail race."

It is found in practice that a small diameter Pelton wheel is the most economical, and for this reason most wheels, except the very largest sizes, are cast with the buckets in position. This ensures the smallest possible wheel. Great skill is required to make a Pelton wheel, as a breakage in use might be very dangerous. When it is considered that the pressure on one bucket alone may be as great as five tons, the magnitude of the task will be apparent.

As already noted, Pelton wheels are

This sectional drawing of a small Francis turbine shows how its two sets of vanes are arranged.

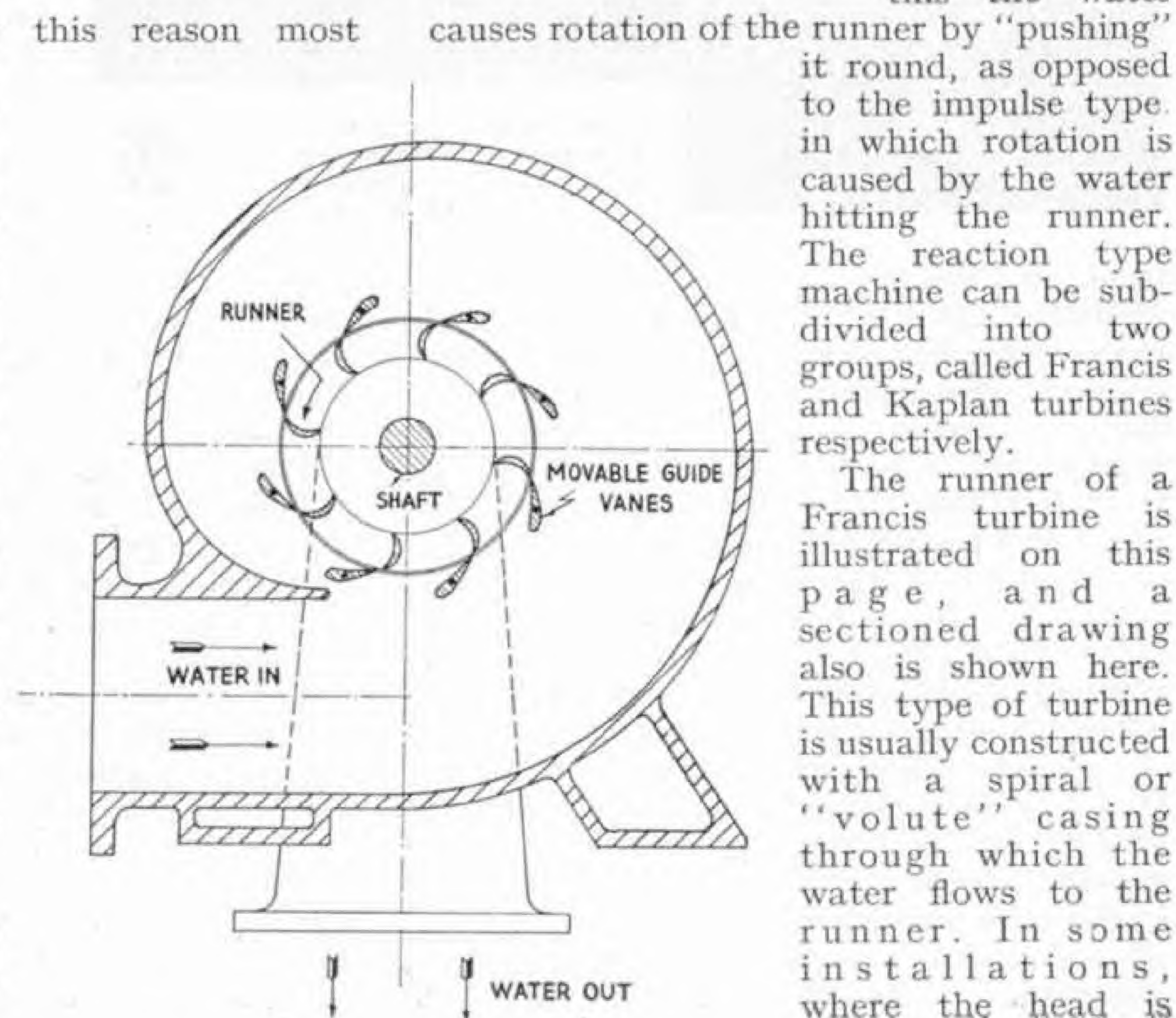


The runner of a Francis turbine. This is a reaction turbine, the water "pushing" the runner round.

used in situations where there are high heads of water, but only in relatively small quantities. It is rare to find a Pelton wheel operating under a head of less than 100 feet, and the head usually is well above this figure. In some circumstances, where there is a fairly large quantity of water available under a high head, two, three or sometimes even four jets act on the one wheel. This arrangement presents

certain difficulties in regulation and governing, and to avoid these at least one firm has developed a specially shaped impulse wheel that can deal with a sufficient quantity of water from one jet.

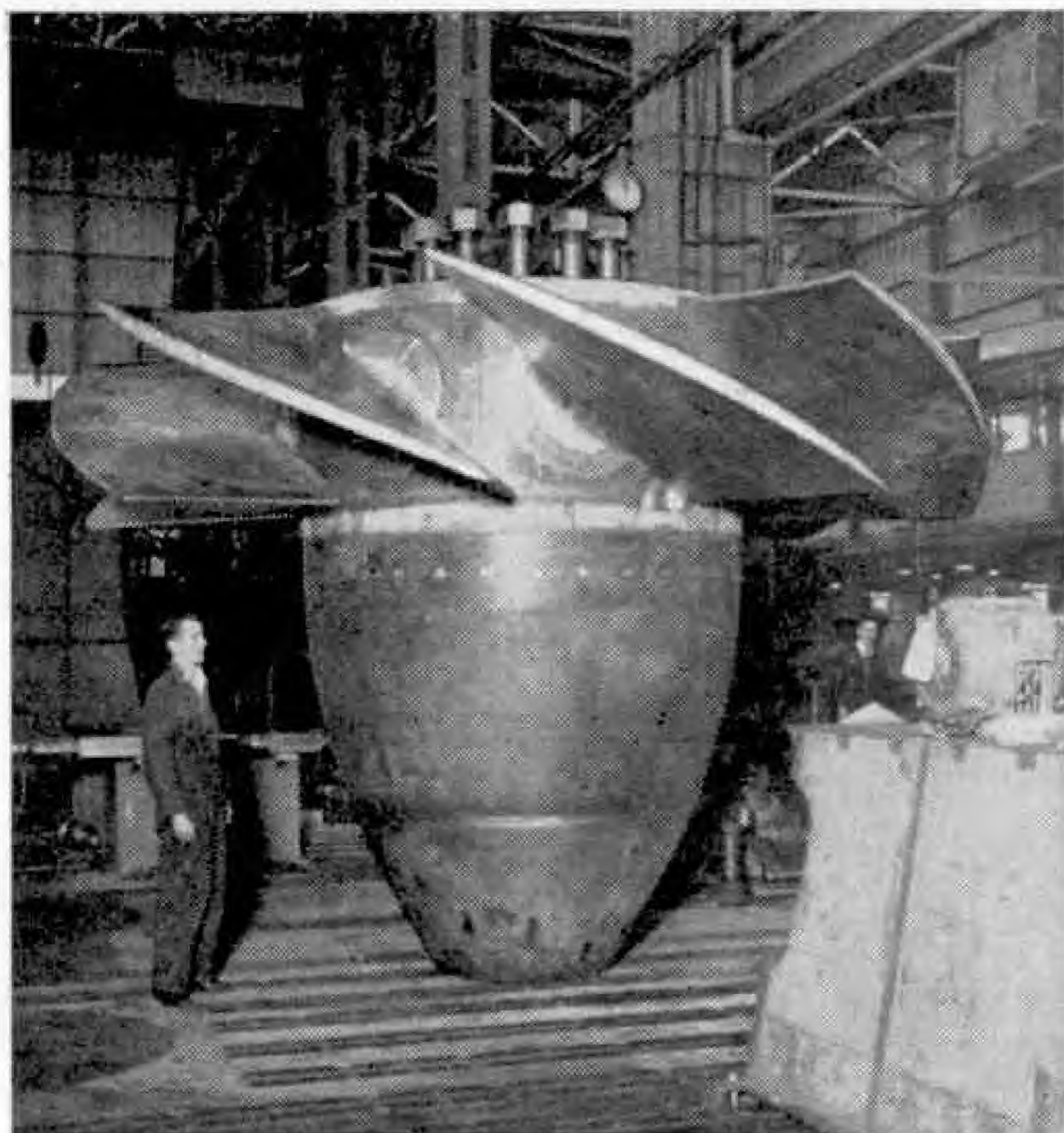
The other main type is termed the reaction turbine. In this the water



causes rotation of the runner by "pushing" it round, as opposed to the impulse type, in which rotation is caused by the water hitting the runner. The reaction type machine can be subdivided into two groups, called Francis and Kaplan turbines respectively.

The runner of a Francis turbine is illustrated on this page, and a sectioned drawing also is shown here. This type of turbine is usually constructed with a spiral or "volute" casing through which the water flows to the runner. In some installations, where the head is

very low, the spiral casing is dispensed with, a rough concrete channel being constructed instead for the flow of water.



A Kaplan type reaction turbine runner. The illustrations to this article are by courtesy of English Electric Co. Ltd.

From the drawing it can be seen that water enters the casing and flows around the spiral and through the guide vanes, the shape of the spiral being so arranged that it is evenly distributed to the runner. After passing through the guide vanes the water has a definite "swirl" in the direction of rotation of the runner, and on entering the runner its pressure causes the latter to rotate, thus producing power. The angles of the guide vanes and runner blades are so arranged that the water leaves the turbine with little or no swirl, to flow down the "draught tube" to the tail race. It is interesting to note that the negative or suction head between the tail race and turbine is just as useful in producing power as a positive or pressure head is on the other side of the turbine. This is because the water in the draught tube tends to

suck water through the turbine more quickly than would otherwise be the case.

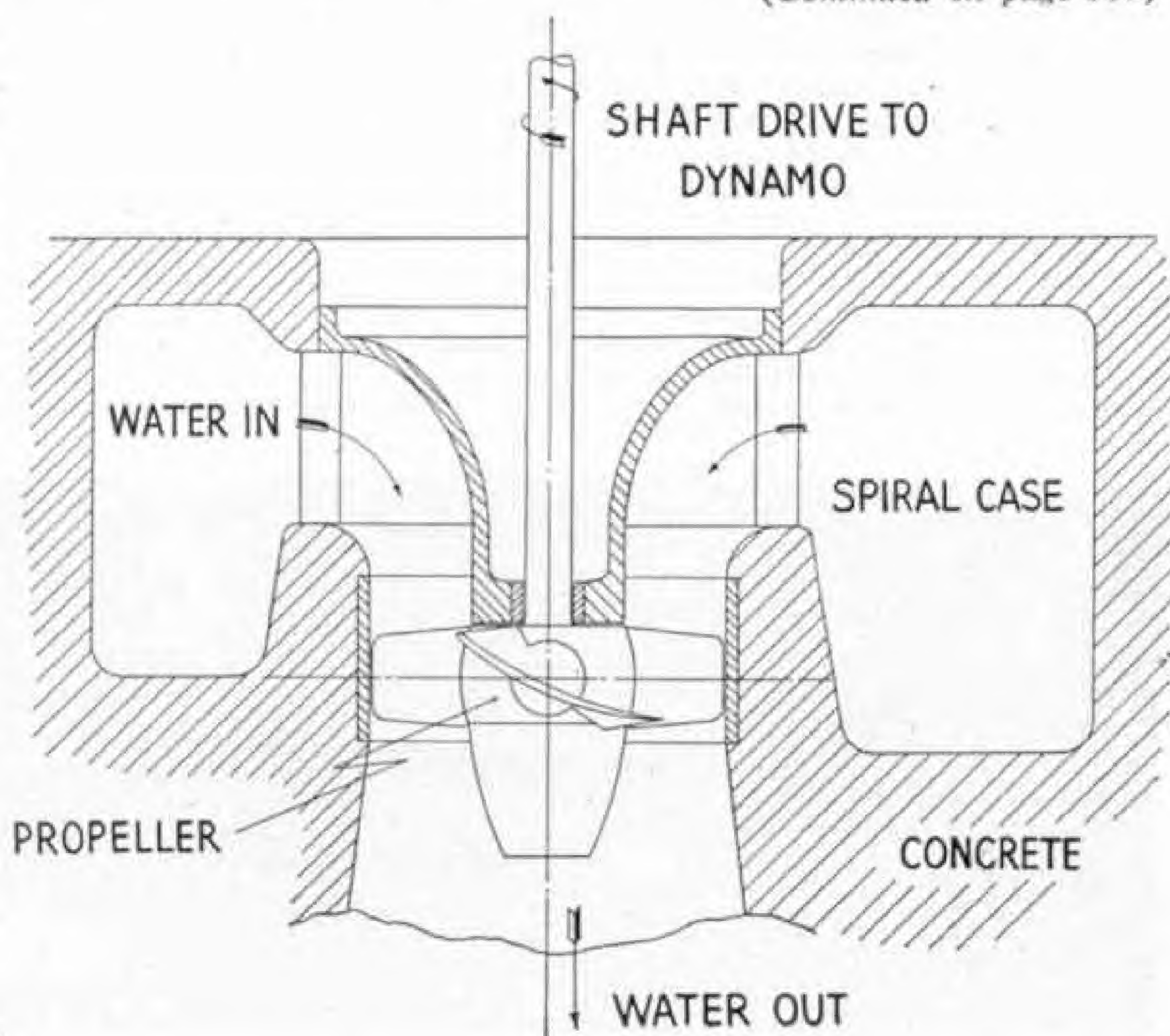
The speed of a Francis turbine is controlled by varying the angle of the movable guide vanes, which can be moved to let more or less water through as desired. Francis turbines are used for low and medium heads and for widely varying quantities of water.

The other type of reaction machine is the Kaplan or propeller turbine. From the photograph reproduced on this page it can be seen that the runner resembles a ship's propeller, and in fact from a hydrodynamic point of view they are almost identical.

The operation of a Kaplan turbine is very simple. It is merely a vertical tube inside which the runner is fitted. The blades of the runner have a small radial clearance between the tips and the walls of the tube. The water flowing down the tube causes the propeller to rotate, the shaft drive being taken through the inlet pipe, as shown in the accompanying drawing.

The Kaplan turbine runner shown in the photograph is for a very large installation, and has feathering blades to control the speed of the rotation. On smaller sets the runners usually have fixed blades and hence no very convenient method of speed control is possible. For this reason Kaplan turbines are to be preferred only in the larger sizes.

(Continued on page 508)



How the Kaplan turbine runner works.

Air News

By John W. R. Taylor

Jet-Liners for the Army

News of a production order for the Vickers V.1000 military jet transport and an additional contract for piston-engined Blackburn Beverley freighters, 20 of which were ordered last year, is the most encouraging sign so far that the British Army is waking up to the value of air transport of troops and equipment. The aircraft will, of course, be operated by R.A.F. Transport Command, as the Army has no aircraft of its own.

The V.1000 looks like a low wing version of the Valiant bomber, but is actually a much larger aircraft, with a wing span of about 140 ft. and accommodation for up to 150 passengers. It even carries its own electric lift to raise heavy loads from the ground to the level of its cabin when used for freight-carrying. Powered by four of the new and secret Rolls-Royce Conway by-pass turbojets, it has been designed to fly for very long distances at just below the speed of sound. The prototype, which is due to fly next year, will serve also as a prototype of the Vickers V.C.7 civil air liner, which is generally similar.

The V.1000s are intended for very fast "cannonball" services, to move urgently-needed troops or equipment to trouble spots.

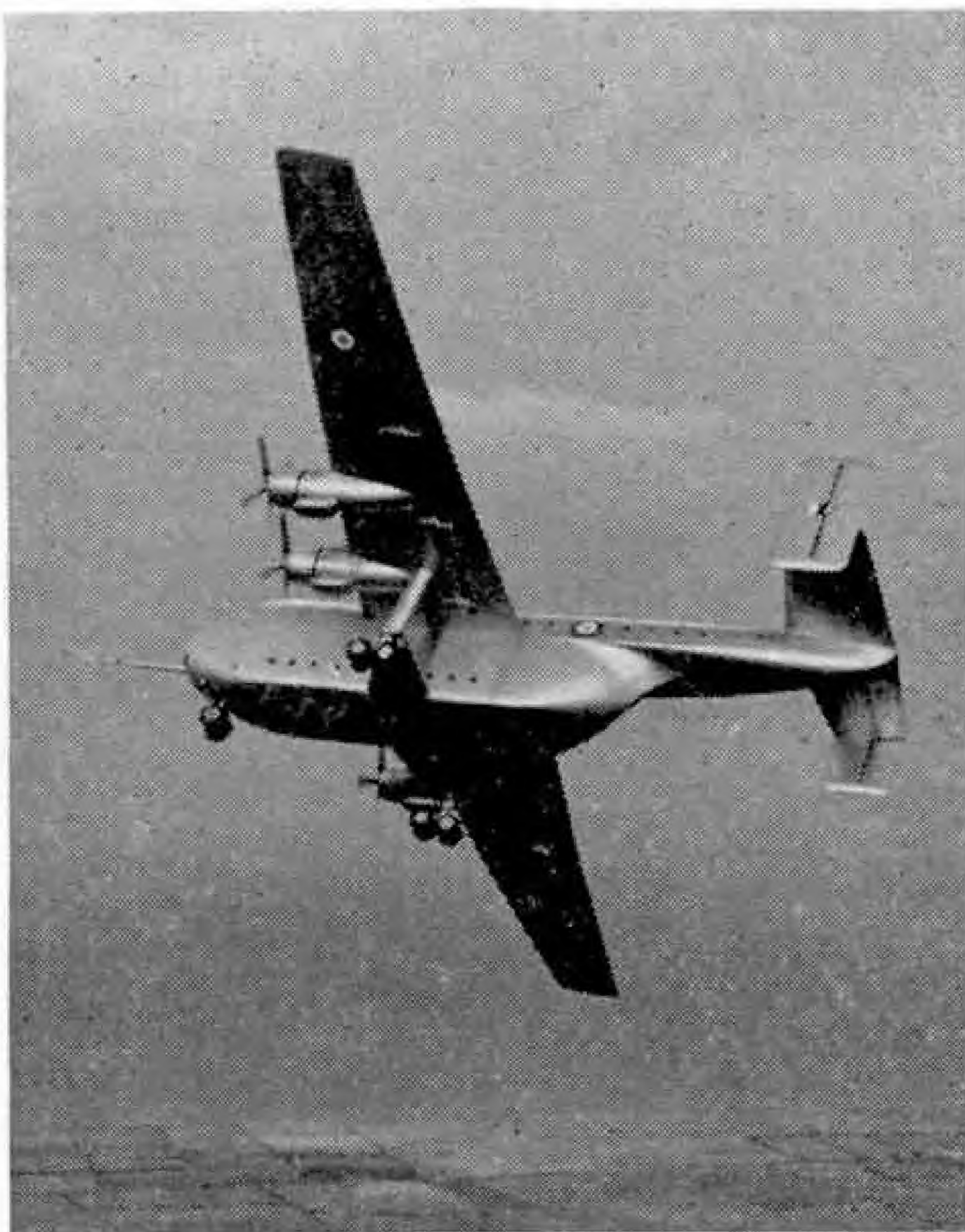
The Beverleys, one of which is illustrated on this page, will be used for short-range missions, either to parachute troops and supplies into combat zones or to deliver them to forward airfields that would be too small or rough for other transport aircraft to use. Their carrying capacity can be judged from the fact that each will hold 10 jeeps in its main double-deck freight-hold, as well as troops in its big tail boom. Yet flight trials have shown that the Beverley will maintain height on only two of its four Centaurus engines when fully-loaded.

Automatic Navigation

The Sperry Corporation of America have produced a new instrument by which pilots will be able to check their latitude and longitude without using air-to-ground or ground-to-air communications.

The device consists of four boxes which weigh 45 lb. and have a total volume of less than 1½ cu ft. Into one box the pilot dials his wind speed and direction and magnetic variation. Into another he sets his latitude and longitude at take-off. Once the 'plane is airborne, the third box does the calculating, and the pilot can read off his changing position as he flies, the fourth box serving as an amplifier.

Sperry claim that the latitude-longitude finder will be particularly valuable for military use, because it neither depends on ground signals to work properly



Blackburn Beverley freighter, a type on order for R.A.F. Transport Command.

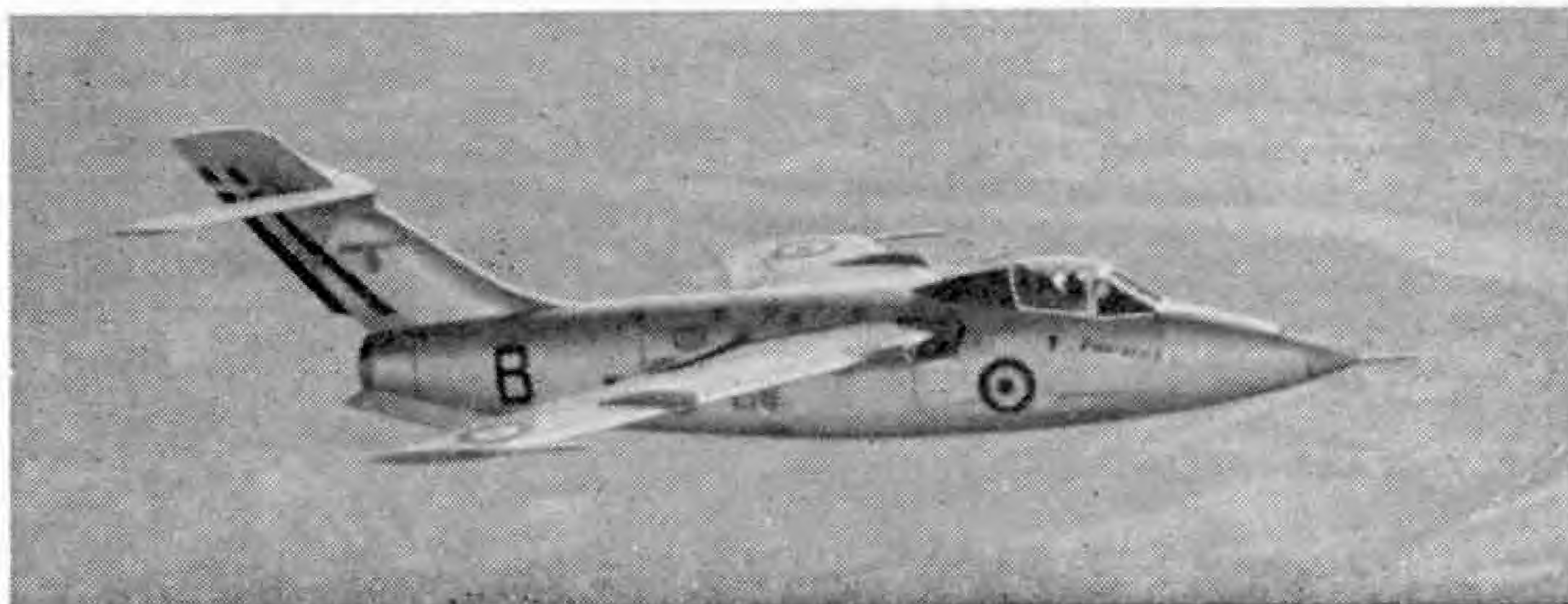
nor sends out signals which an enemy could pick up. It will relieve fighter pilots of much of the additional burden of navigating their aircraft. Commercial users will benefit from the fact that, being independent of radio signals, it cannot be upset by atmospheric conditions, such as electric storms.

Supersonic Baroudeur

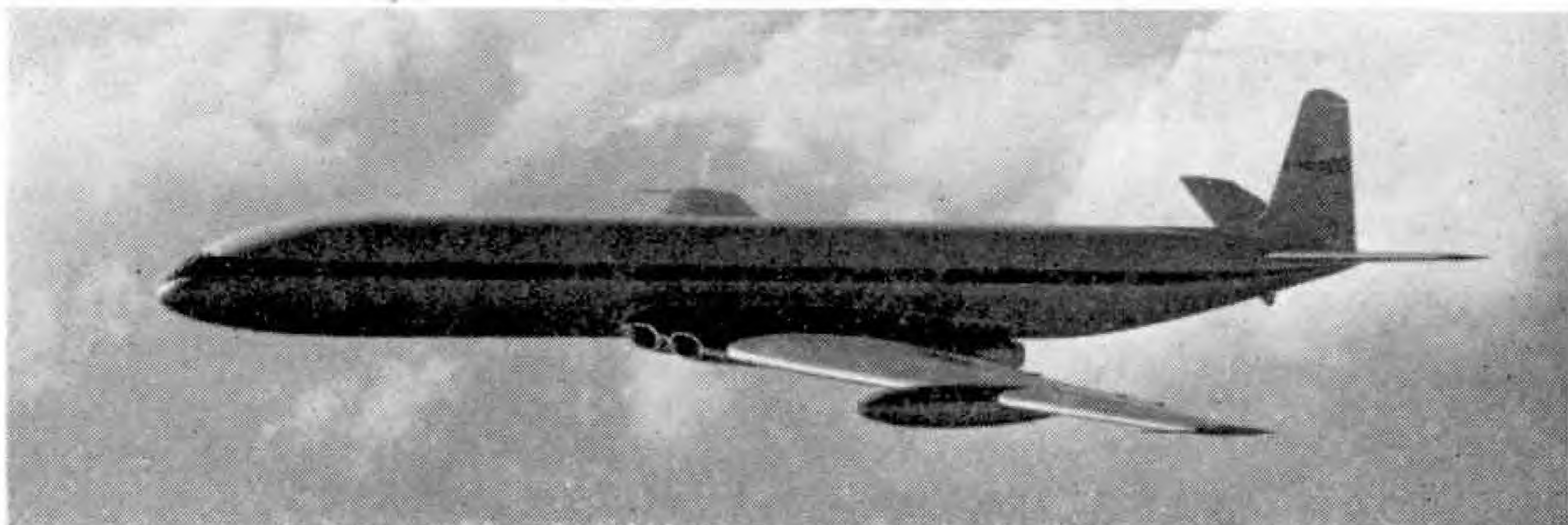
On 17th July last, the French SE.5000 Baroudeur lightweight ground attack jet fighter flew faster than sound for the first time, piloted by Pierre Maulandi.

Powered by a SNECMA Atar turbojet, the Baroudeur has no normal undercarriage, but is designed to take off with the aid of a rocket-propelled trolley and to land on small retractable skids. It has also taken off on its skids on many occasions, proving that the two alternative methods enable it to operate from almost any kind of surface, including pebbles, uncultivated fields, beaches, mud and frozen ground.

A special brake has now been added to the landing skids, reducing the Baroudeur's landing run still further and making it as manoeuvrable on the ground as any conventional aircraft.



The SE.5000 Baroudeur ground attack fighter, production of which has begun for the French Air Force.



Prototype de Havilland Comet 3 in the air. It is much longer than the two earlier versions.

Comet 3 Flying

The prototype de Havilland Comet 3 jet-liner, shown above, made its first flight from Hatfield Aerodrome on 19th July last, piloted by John Cunningham. Due to enter service in 1957, it can be distinguished from earlier Comets by its much longer fuselage and the two external fuel tanks carried on the leading edge of its wings.

It will complement, not replace, the Comet 2, which has nearly completed its flight trials. Together, the two versions will in fact meet almost all requirements for long-range and medium-range intercontinental express travel, the Comet 3 carrying 58 first-class or 76 tourist-class passengers on stages of up to 2,600 miles, and the Comet 2 carrying 44 passengers on stages up to about 2,200 miles. Both are powered by four Rolls-Royce Avon turbojets, the Comet 2 engines giving 7,000 lb. thrust each, and the Comet 3 engines 10,000 lb.

Comet 3s have been ordered by B.O.A.C., Pan American World Airways and Air-India International.

Remembering Columbus

Iberia Spanish Airlines' fleet of three Lockheed Super Constellations have been named after the ships that formed the fleet of Christopher Columbus when he discovered America—the *Santa Maria*, *Nina* and *Pinta*.

The modern *Santa Maria* could be arranged to carry more passengers than the 88 men who manned all three of Columbus' ships. In the luxury version ordered by Iberia, however, it will carry only a crew of 11 and 59-63 passengers. By cruising over the Atlantic at 330 m.p.h., it will fly from Madrid to New York in about 12 hrs., compared with the 71 days taken by the original *Santa Maria* on her voyage of discovery.

Drop Test Models

Supersonic pilotless scale models have been used to test in flight the design of the projected French S.N.C.A.N. Harpon fighter, before the piloted prototype is completed. No photographs have been released, but the models must be quite large as they are two-fifths as big as the full-size aircraft.

In tests from Colomb-Bechar airfield, the models were released from a "mother-plane" at a height of 20,000 ft. and controlled by an automatic pilot during

faster-than-sound flights. Their performance and behaviour were recorded automatically by test instruments in their fuselages; and the models were landed by parachute to avoid damage when their fuel was exhausted.

The Sikorsky S-56

The lower illustration on this page shows the new twin-engined Sikorsky S-56, one of the most important helicopters flying today because, although designed for the U.S. Marine Corps, it may be used to pioneer city centre-to-city centre civil "airbus" services in America and Britain. B.E.A. have, in fact, already indicated that they would like to buy S-56s to tide them over until the 40-passenger Fairey Rotodyne is ready for service.

Designated HR2S-1 by the U.S. Marines and H-37A by the U.S.A.F., the S-56 is comparable in size to a Dakota and carries about the same number of passengers. It is powered by two 1,900 h.p. Pratt



The new Sikorsky S-56 twin-engined helicopter, designed for the U.S. Marine Corps.

and Whitney R-2800 engines, mounted in nacelles at the end of short stub wings. The main undercarriage wheels also retract into these nacelles—a feature which contributes to the aircraft's top speed of 156 m.p.h. Its five-bladed main rotor has a diameter of 90 ft. and folds for stowage aboard ship. It has a conventional four-bladed tail rotor.

Able to carry two combat assault squads, totalling 26 fully-equipped troops, or vehicles and freight, the HR2S-1 will enable the Marines to develop still further their technique of using helicopters instead of landing barges for beach-head assault.

The Life-boat Service

IT is now 130 years since the Royal National Life-boat Institution was founded by Sir William Hillary, and it would be very difficult indeed to find a more enthralling story of heroism than is to be found in the accounts of the rescues that the men of the life-boat service have effected round the shores of the British Isles during that time. All the money the Institution requires for carrying out its tasks comes from voluntary gifts, and the overwhelming majority of the life-boat crews are part-time volunteers. Yet when there is life to be saved these men go out in storm readily and eagerly from their 150 life-boat stations, and demands on them continually increase. In 1923, for instance, life-boats went out to the rescue 300 times, but by 1953 the

Launching the "W. and S," the modern successor to the old "Richard Lewis" of Penzance.

number had increased to 598.

What risks the life-boatmen face, and the magnificent spirit that animates them, are strikingly illustrated in the 1954 edition of *The Story of the Life-boat*. Take as an example the story of a West Country rescue in 1868. One December day a large barque drove ashore in Penzance Bay. The life-boat *Richard Lewis* was on her way to the spot in five minutes, and tried to reach the stranded ship through a tremendous ground sea. She did so after a pull of more than an hour. But a great sea then struck her, capsizing her and throwing all on board into the sea, where the coxswain was jammed under the boat and almost lost his life. Eventually he was dragged on board, apparently dead. The exhausted

crew just managed to bring their boat to shore after it had righted itself, and then a second attempt was made to reach the vessel, with another crew of volunteers. In the teeth of a tremendous wind and sea the boat was slowly pulled to windward, gaining inch by inch until at last the remaining men on the wreck could be taken aboard.

There is an interesting link between the life-boat concerned in this story and the illustration on this page. The latter shows the launch of the *W. and S.*, the fine motor vessel that is the modern successor to the *Richard Lewis*.



The *Richard Lewis* was pulled to the rescue by oars, but the modern life-boat is a fine motor vessel, splendidly equipped with life-saving appliances. The same spirit prevails in the service of today as was shown by the men who ventured out in stormy weather in the pulling and sailing life-boats of earlier days, as the stories told in these pages show. It is impossible to read them without acquiring the deepest admiration for this magnificent service, which in the words of Sir Winston Churchill "drives on with a mercy which does not quail in the presence of death,... as a proof, a symbol, a testimony, that man is created in the image of God, and that valour and fortitude have not perished in the British race."

The Story of the Life-boat. Copies, price 1/-, may be obtained from the Royal National Life-boat Institution, 42 Grosvenor Gardens, London S.W.1, or from any of the Institution's branches.

Locomotive Without a Chimney

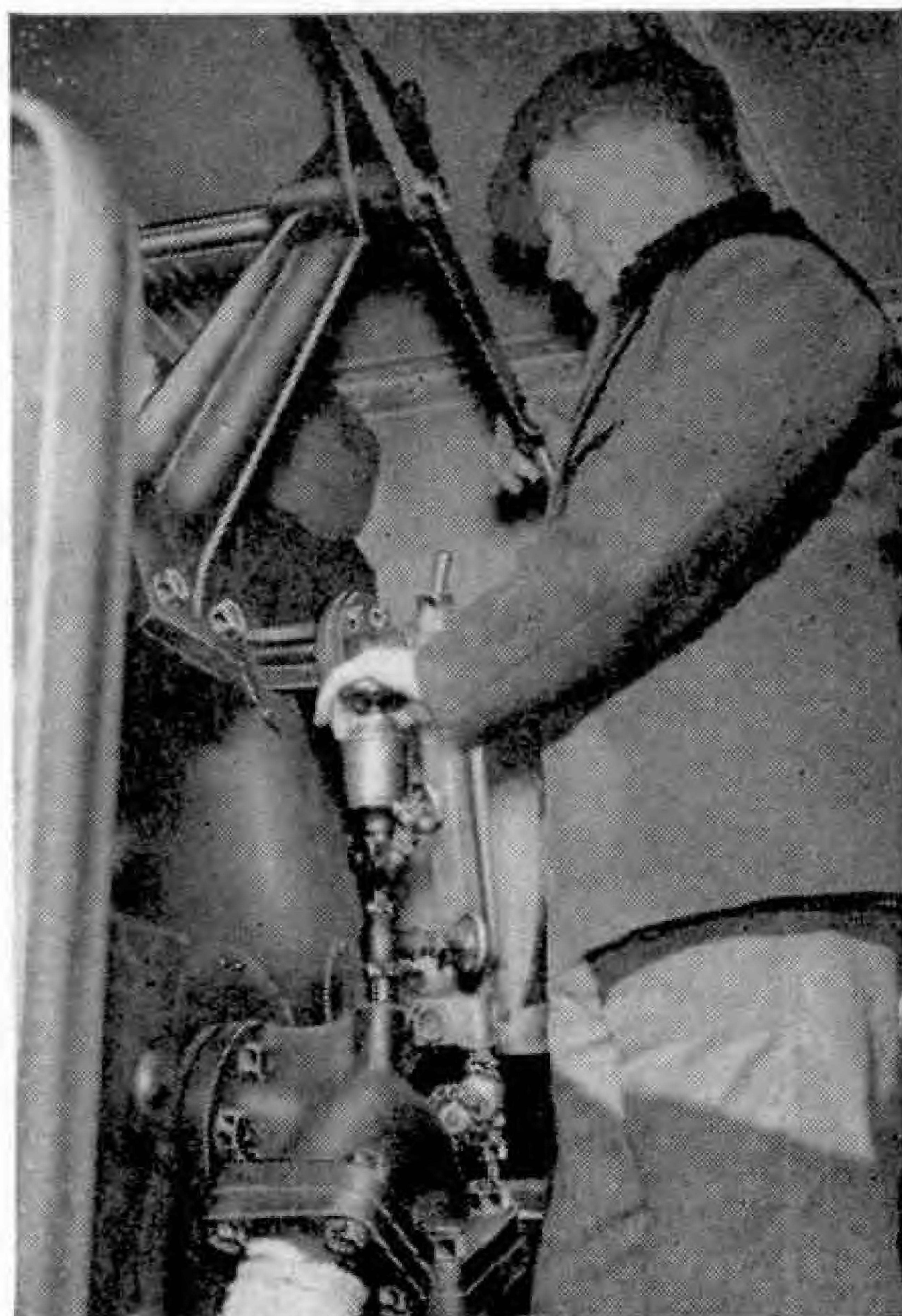
By J. Dixon Notman

DRIVER Jimmy McKnespiey at Carlisle has one of the cleanest steam locomotives in the country. His white collar is always spotless, for his engine has no fire-box, no coal, no smuts and no chimney.

There are other locomotives like this one in use today. They all look queer when first seen, because they are steam engines without chimneys. To make up for this want Jimmy McKnespiey's engine has a super steam-dome and a really musical bell-whistle. The "boiler" is unusual. It is really a giant thermos flask, and engineers call it a steam accumulator. It is filled with live steam once or twice a day, according to the amount of shunting the engine has to do.

This locomotive is a relic of the first World War and was specially made at Kilmarnock, Scotland, by Messrs. Andrew Barclay in 1915, for the Government. It was used at the Gretna Munition Works on the Borders, where it was necessary to have haulage power without sparks or flame of any kind. After the war it was purchased by Carr and Co. Ltd. for shunting duty in their Biscuit Works at Carlisle, where the advantage of a clean working engine is clearly a prime factor.

Despatch is the name announced by the nameplate of the engine. It is maintained

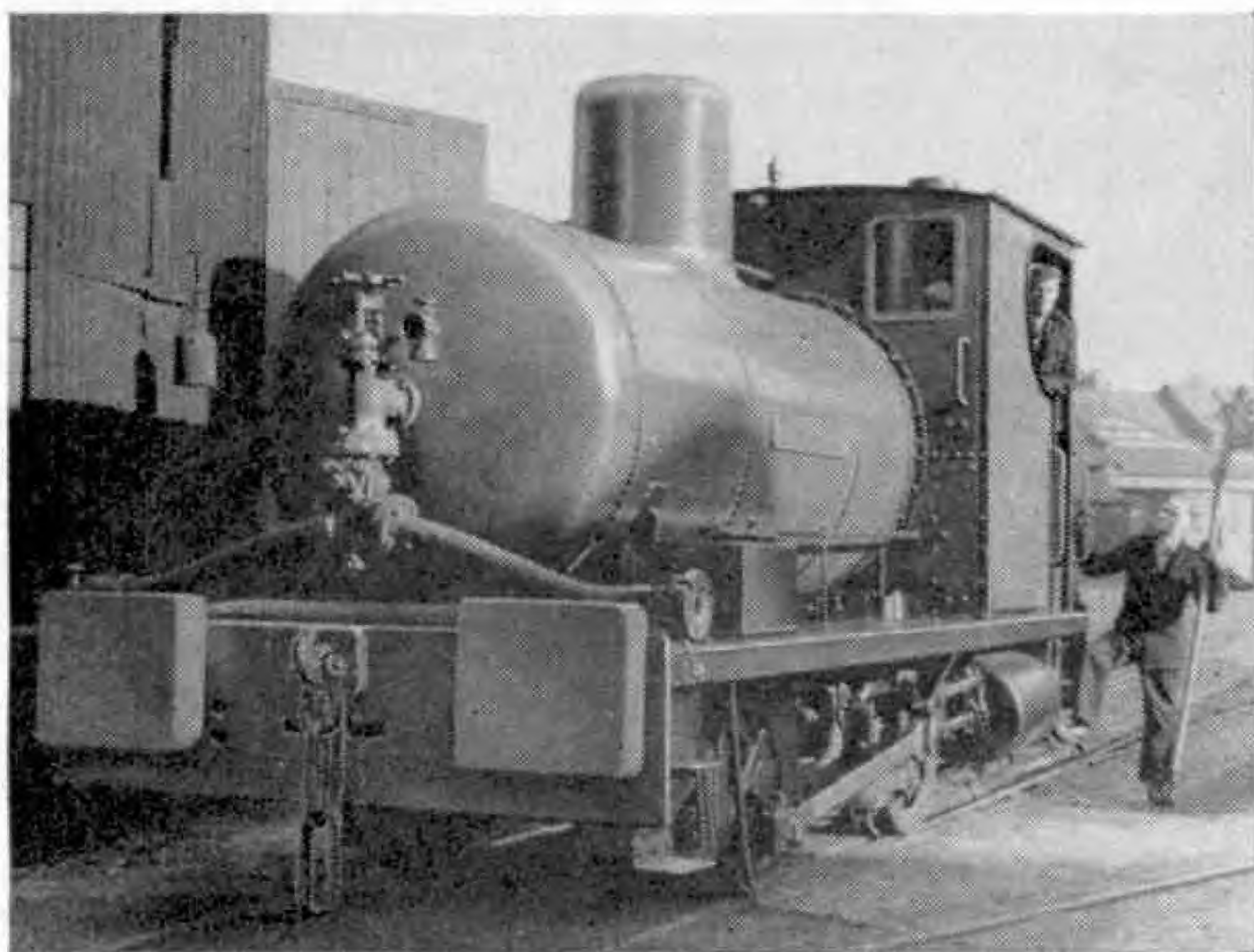


Driver McKnespiey adjusts the lubricator feed in the cab of his fireless locomotive.

in a brilliant green enamel, which contrasts vividly with red lining, the silver steel connecting rods of the outside cylinders and the bright golden bearing-brasses of the crank-pins. Where the smoke-box door is usually found on a locomotive is a steam inlet pipe, attached to the front end of the boiler, and branches to the side of the engine allow convenient coupling to one or other of the various Works steam mains, at several points in the yard.

The steam pressure is around 100 lb. per sq. in., and control is exercised by means of a throttle. The simple valve motion has no cut-off.

Driver McKnespiey has no fire to light, no ashes to dump and no water gauge to watch—but finds that it can be cold in the cab in the winter.



The fireless locomotive ready for work.

Among the Model-Builders

By "Spanner"

A Meccano Fretwork Machine

Meccano is useful in many ways quite apart from its main function for model-building. For example it is possible to use the parts for assembling useful and practical tools for the home workshop, and I have had in use for many years a really sturdy and satisfactory hacksaw frame and a small and handy drilling machine made entirely from Meccano parts. Another example of tool-making that has recently come to my notice is a fretwork machine that was built by Mr. B. W. Rowe, Buckfastleigh, Devon, and which is sufficiently sturdy and strong to turn out really good work in 3-ply wood. The main details of the machine can be seen in the illustration alongside. Readers may remember that Mr. Rowe was one of the First Prize winners in the 1953 International Model-Building Competition and is a model-builder of considerable skill and experience.

A Contra-Rotating Airscrew

Readers interested in aircraft engineering will be attracted by the contra-rotating airscrew device

shown in Fig. 2. This was designed and built by J. A. Hill, Belfast, to whom I am indebted for the following details.

The frame that supports the main shaft

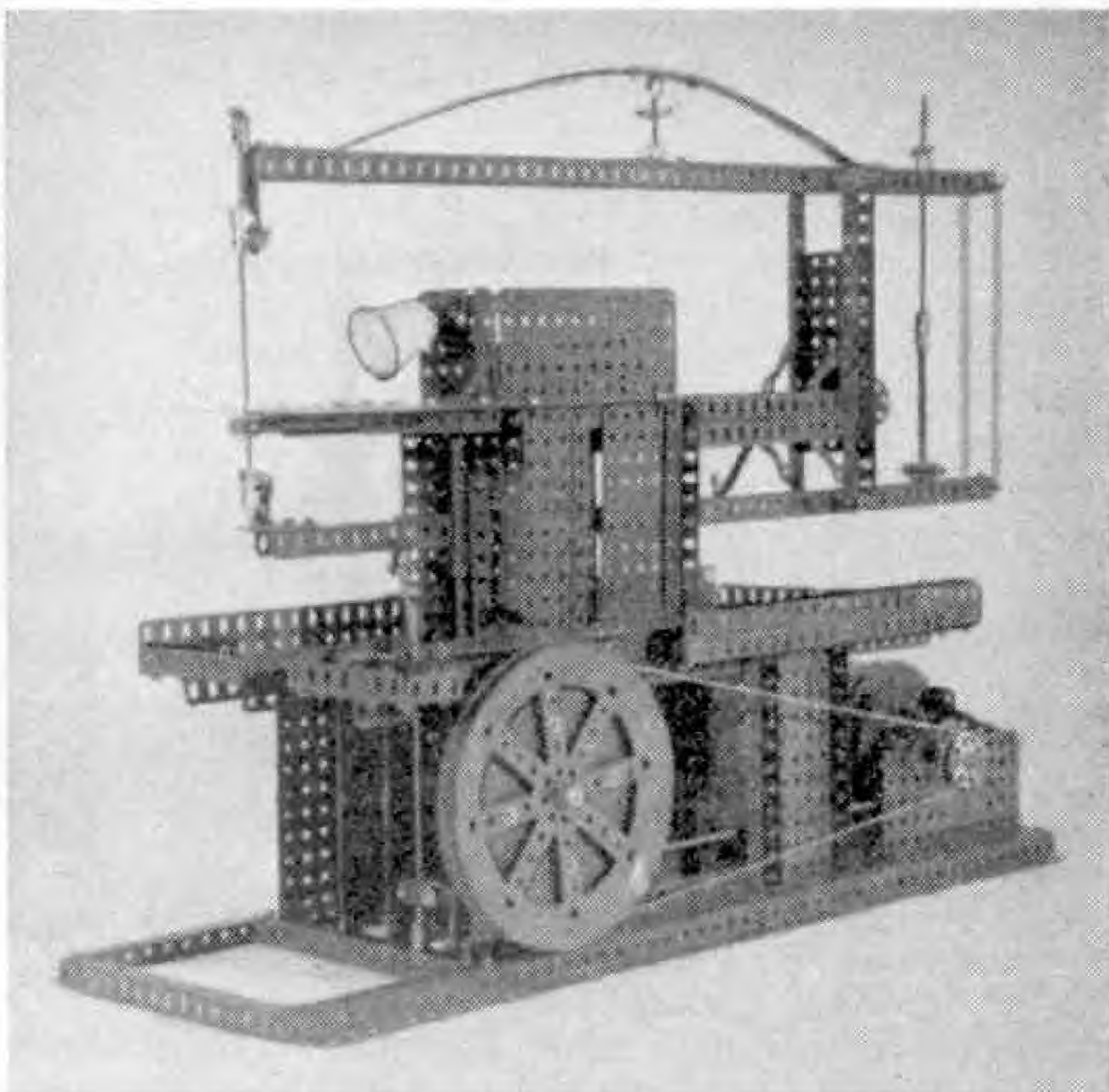
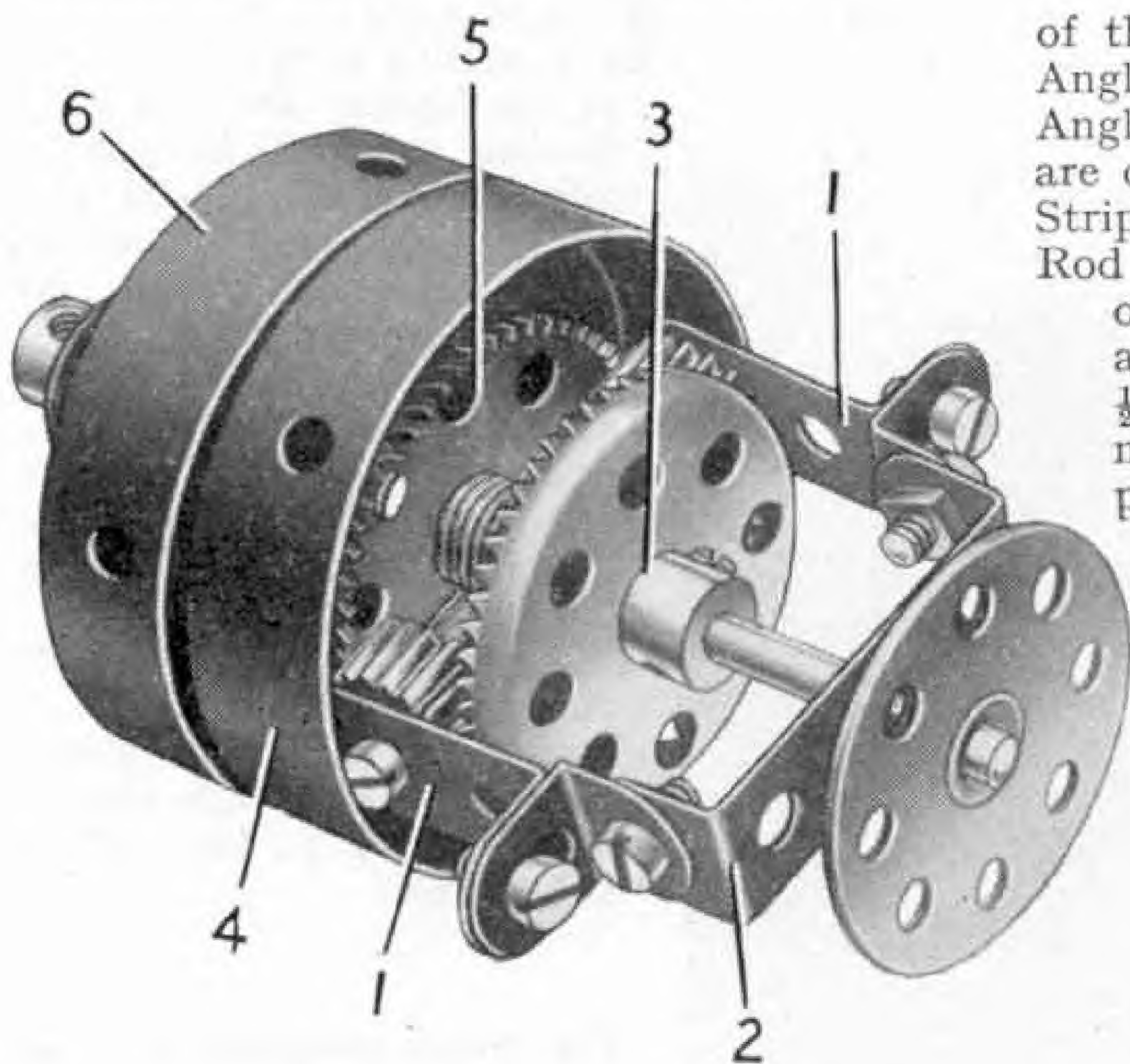


Fig. 1. This useful fretwork machine built from Meccano parts is sufficiently sturdy to cut three-ply wood. It was designed and constructed by Mr. B. W. Rowe, Buckfastleigh.



of the mechanism consists of two $1" \times \frac{1}{2}"$ Angle Brackets 1 each fitted with a $\frac{1}{2}" \times \frac{1}{2}"$ Angle Bracket as shown. The Brackets are connected by a $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip 2, in the centre hole of which a Rod of suitable length is mounted. Fixed on this Rod is a $1\frac{1}{2}"$ Contrate 3 that is arranged so that it can engage two $\frac{1}{2}"$ Pinions, each of which is freely mounted on a $\frac{3}{4}"$ Bolt. The Bolts are passed through the slotted holes of the Angle Brackets 1 and then are screwed into the threaded holes of a Collar mounted on the Rod. Each Bolt is fixed in position by tightening a nut on it against the Collar, but the Bolts must not fix the Collar itself on the Rod.

A Boiler End 4 is passed over the Rod, and two $\frac{3}{8}"$ Bolts fixed

Fig. 2. The contra-rotating airscrew device described on this page.

in it by nuts engage holes in a $1\frac{1}{2}$ " Contrate 5. The Contrate is loosely mounted on the Rod with spacing Washers placed between it and the Collar, so that the Contrate meshes accurately with the two $\frac{1}{2}$ " Pinions. A Collar is placed outside the

use in models such as cranes for controlling the drive to the winding drums.

In Fig. 3 a winding drum shaft is represented by the Rod 1, on which a 3" Pulley is mounted freely. The Pulley is driven by a Driving Band passed round a $\frac{1}{2}$ " Pulley on a Rod 2. A 1" Rod is passed through a hole in the 3" Pulley, and is fitted at one end with a Collar 3 and at the other end with a 50-tooth Gear. The Collar 3 is fitted with a bolt to which a length of Cord is tied and then passed round a $1\frac{1}{2}$ " Pulley 4 fixed on the Rod 1, and fastened to a $\frac{1}{2}$ " Bolt fixed in the 3" Pulley by two nuts.

The 50-tooth Gear meshes with a $\frac{3}{4}$ " Pinion that is coupled to a 1"

Pulley 5 by a Socket Coupling. This unit is free to rotate on Rod 1, but by means of a band brake formed by a length of Cord passed round the Pulley it can be retarded as desired. One end of the Cord is tied to the baseplate, and the other end is fastened to a pivoted lever 6. When the Cord round Pulley 5 is slack the 3" Pulley and Pulley 5 turn as a unit freely on Rod 1. If the Pulley 5 is retarded by the band brake, however, the 50-tooth Gear rotates round the $\frac{3}{4}$ " Pinion and thus tightens the Cord round the Pulley 4. As this is fixed to Rod 1 it transmits the rotation of the 3" Pulley to the Rod.

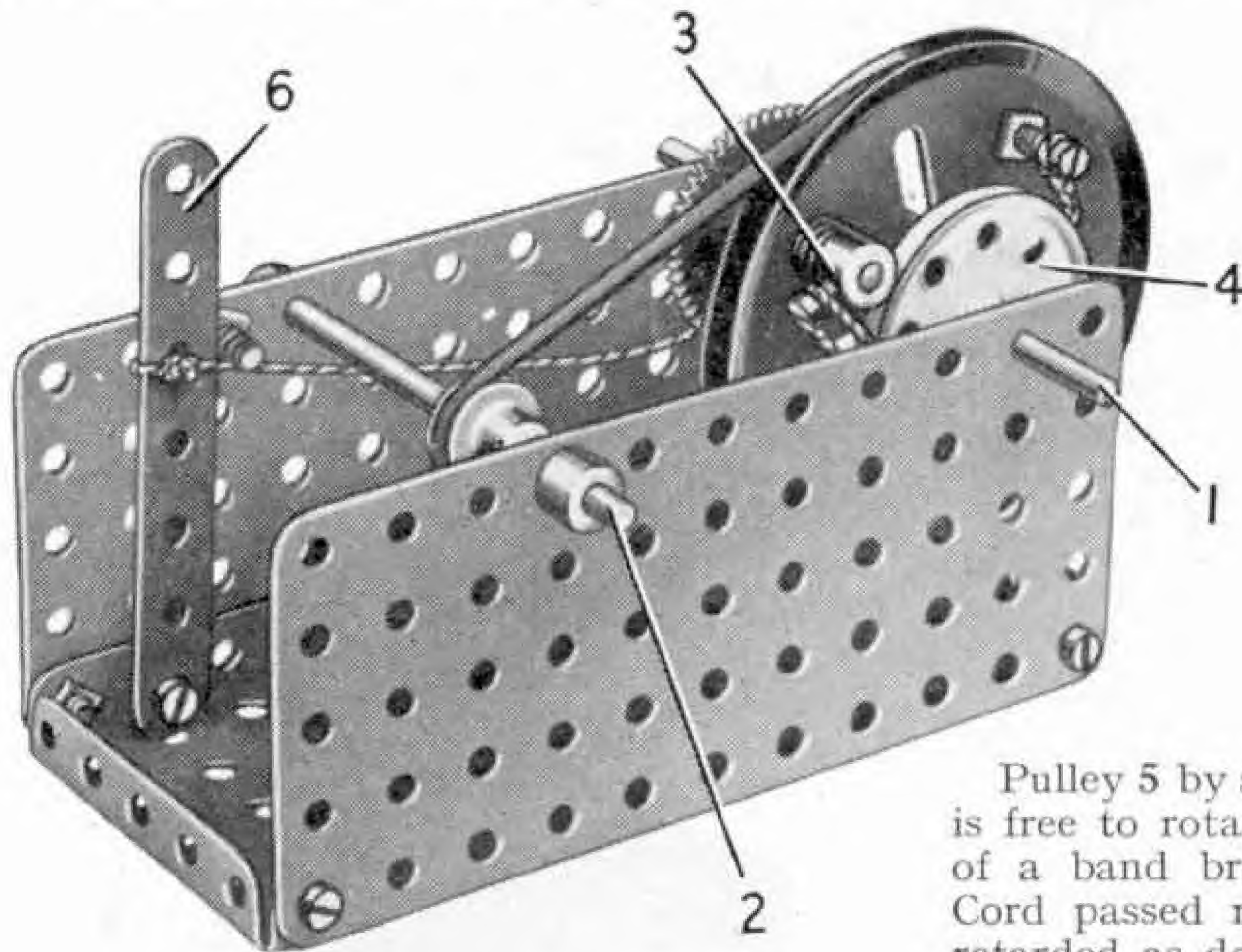


Fig. 3. A servo friction clutch designed to take up and transmit a drive smoothly.

Boiler End to keep the Contrate 5 in mesh with the Pinions.

A Boiler End 6 has a Bush Wheel bolted centrally to it, and the set-screw of the Bush Wheel is used to fix the assembly on the Rod. The parts used to represent the airscrews can be attached by Angle Brackets to the Boiler Ends 4 and 6. When the main driving shaft is turned these Boiler Ends rotate in opposite directions.

The mechanism can be attached to a model aircraft by means of the Angle Brackets 1 and the Double Angle Strip 2.

Servo Friction Clutch

Illustrated in Figs. 3 and 4 is a special type of clutch mechanism that makes use of the turning power of the driving motor to bring it into operation. One of its features is that it takes up the drive very smoothly, so that it is particularly suitable for

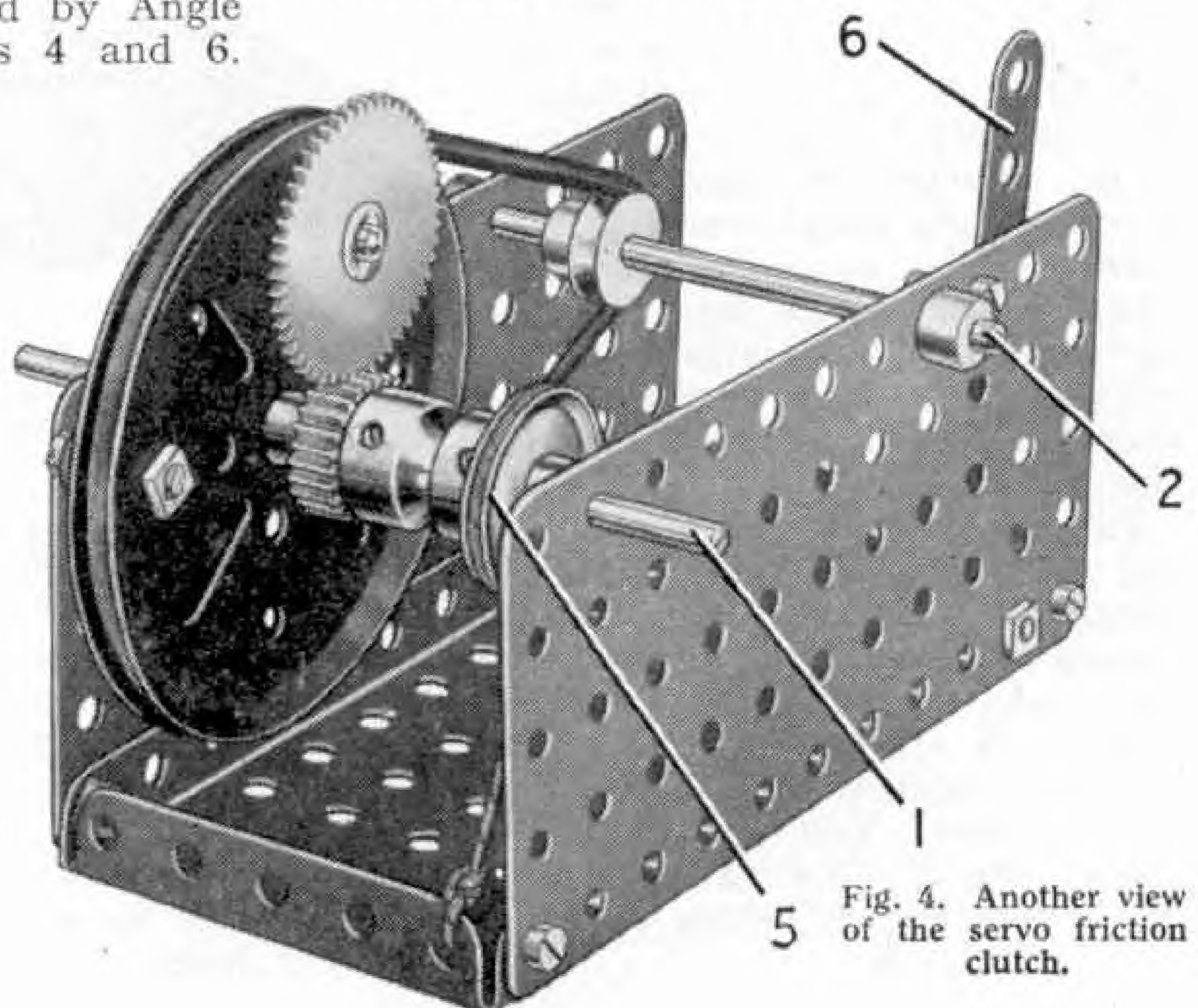


Fig. 4. Another view of the servo friction clutch.

New Meccano Models

Wringing Machine—Mobile Crane

OUR two new models this month are designed for Outfits Nos. 2 and 3. They are a simple domestic wringing machine and a mobile crane. The first to be described is the wringing machine, which is shown in Fig. 1.

You should commence construction with the base, which is a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. To this bolt four Angle Brackets, in the positions shown in the illustration. To each of these attach a $2\frac{1}{2}''$ Strip and bolt the upper end of this to a Flat Trunnion 1. The two $2\frac{1}{2}''$ Strips at the front of the model should be connected to the Flat Trunnions by $\frac{3}{8}''$ Bolts, and on each of these Bolts a Trunnion 2 has to be fixed by means of a second nut. Now bolt a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate to the Trunnions to serve as the table of the wringer.

Bolt a $2\frac{1}{2}''$ Strip 3 vertically to each of the Flat Trunnions 1 and fix a $\frac{3}{8}''$ Bolt tightly by a nut to the top end of the Strip. These two Bolts are used to support two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 4 arranged with their lugs overlapped. The Double Angle Strips must be firmly attached by two nuts on each $\frac{3}{8}''$ Bolt, and to each Double Angle Strip you should now fix a $2\frac{1}{2}''$ Stepped Curved Strip.

The next job is to place two 1" Pulleys on a 2" Rod and pass the Rod through a $\frac{1}{2}''$ Reversed Angle Bracket. Now bolt the Reversed Angle Bracket to one of the Double Angle Strips 4 and to the Curved Strip supported by the other Double Angle Strip. Hold the Rod in place with a Cord Anchoring Spring positioned underneath the Reversed Angle Bracket.

For the wringing rollers a Crank Handle and a 2" Rod are used. Pass the Crank Handle through the Strips 3 and the Flat Trunnions 1, and then through the slotted holes of two made-up reversed angle brackets 5. To make these fix two Angle Brackets together by a bolt through their round holes. You should take care to mount the 2" Rod in the slotted holes of the brackets 5 before they are bolted to the Strips 3.

You will require the following parts to build the Wringing Machine: 6 of No. 5; 8 of No. 12; 2 of No. 17; 1 of No. 19g; 2 of No. 22; 33 of No. 37a; 23 of No. 37b; 2 of No. 38; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 4 of No. 111c; 1 of No. 125; 2 of No. 126; 2 of No. 126a; 1 of No. 176; 1 of No. 187; 1 of No. 188.

Mobile Crane

In building the Mobile Crane, which is shown in Figs. 2 and 3, begin by bolting together the Flexible Plates that form the sides of the swivelling cab. The side seen in Fig. 2 is made from a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate and a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate, strengthened as shown by two $5\frac{1}{2}''$ Strips and a $2\frac{1}{2}''$ Strip. To make the window of this side bolt a $2\frac{1}{2}''$ Strip

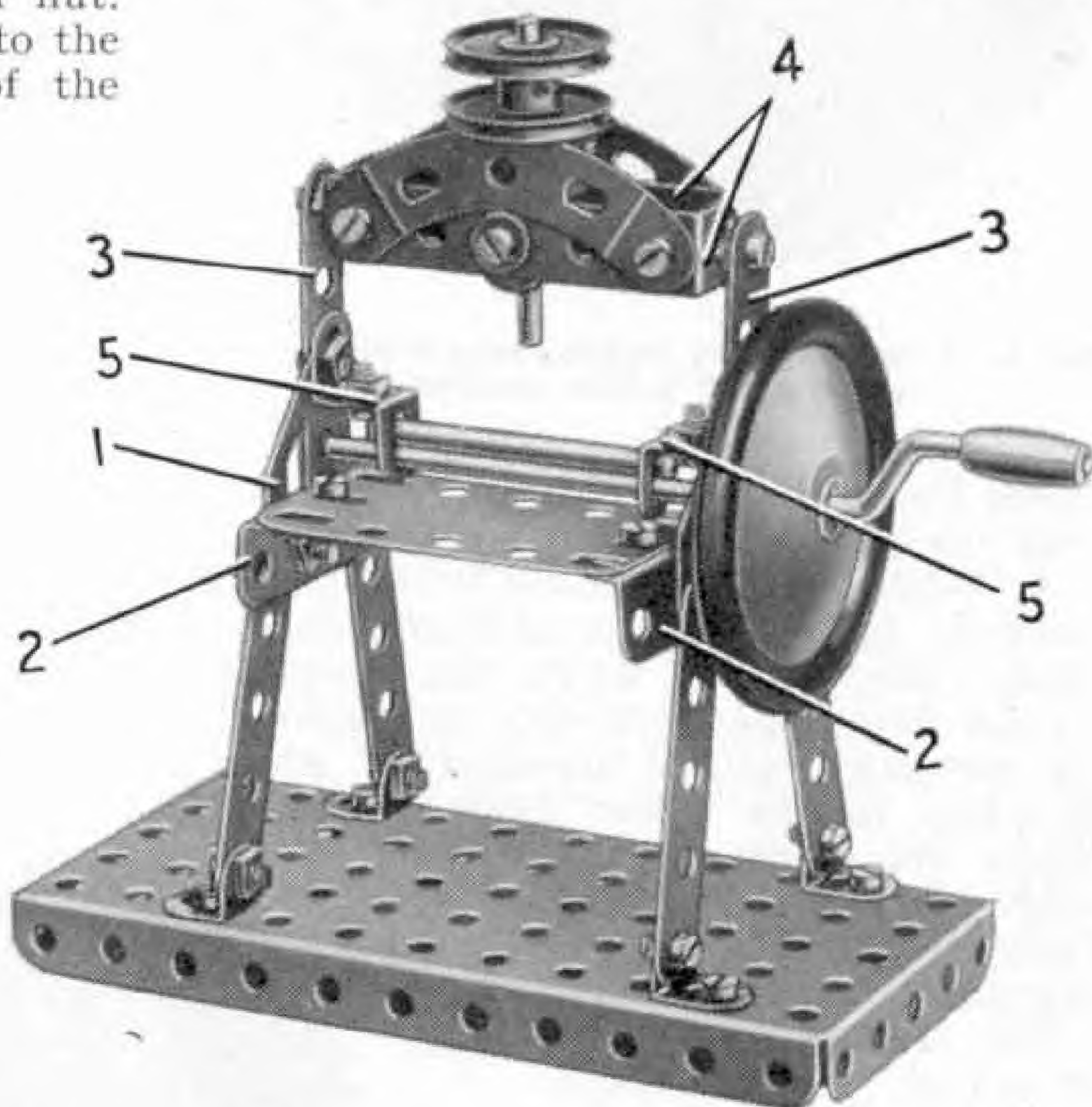
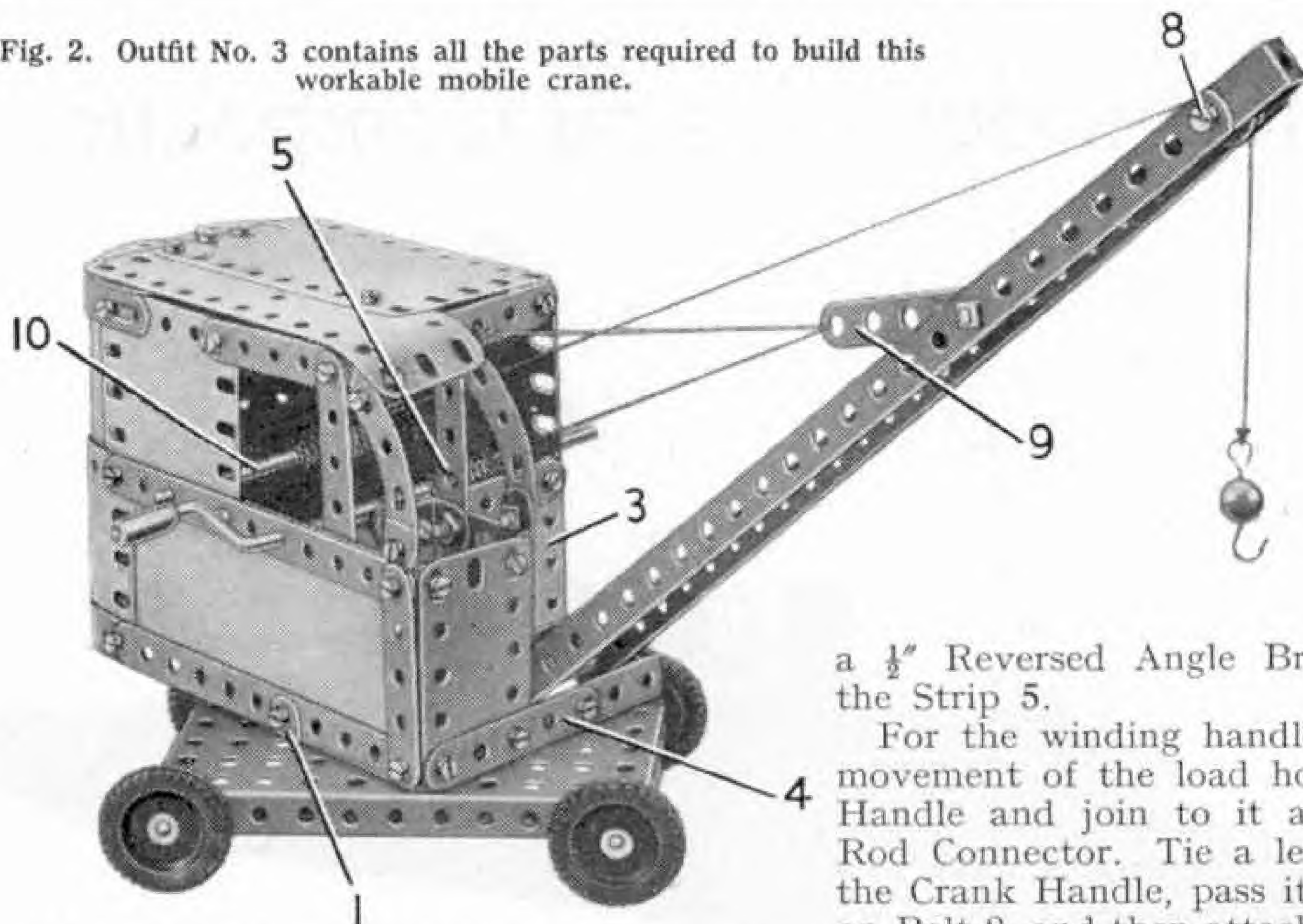


Fig. 1. This simple wringing machine makes an attractive subject for Outfit No. 2.

to the top front corner of the $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate, and to a $2\frac{1}{2}''$ Stepped Curved Strip. Join the Curved Strip by a Fishplate to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate.

For the other side use a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate 2 and a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate, bolted together so that their front edges are level. Fix a $5\frac{1}{2}''$ Strip along the lower edge of the Plate 2 so that it overhangs the front of the Plate by three clear holes.

Fig. 2. Outfit No. 3 contains all the parts required to build this workable mobile crane.



The sides are connected by a bracket 1 made from a Double Angle Strip and two Double Brackets, and by a strip 4 that consists of a Double Angle Strip and a $2\frac{1}{2}$ " Strip.

You can build the front of the cab by placing together two $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Triangular Flexible Plates so that their diagonal edges meet each other. This arrangement makes a $2\frac{1}{2}$ " \times 2" plate 3, and this is then bolted to a $2\frac{1}{2}$ " Strip and attached to one side by Angle Brackets. Now bolt a $\frac{1}{2}$ " Reversed Angle Bracket to the inner end of the $2\frac{1}{2}$ " Strip, and use it to support a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " plate and a $2\frac{1}{2}$ " Strip 5 that form one side of the operating cabin. You can make the plate from two $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Triangular Flexible Plates, which you should bolt together with their diagonal edges overlapped.

Now build the jib by bolting two $12\frac{1}{2}$ " Strips to the arms of a Stepped Bent Strip. You should note that one of the bolts used for this purpose is a $\frac{3}{8}$ " Bolt marked 8, and on it a $\frac{1}{2}$ " loose Pulley is free to rotate inside the arms of the Stepped Bent Strip. Pivot the jib on a $3\frac{1}{2}$ " Rod and use Spring Clips to space the Strips apart.

The next step is to fit the winding handles. One of these is a 4" Rod 10 and it carries a Road Wheel. Pass the Rod through the sides of the cab and fix it in place by a Spring Clip. Now tie

a piece of Cord to the Rod and pass it through a Strip 9 and finally fasten it to a $2\frac{1}{2}$ " Strip. This Strip is fixed at the top of the front of the cab, and is connected to one side by an Angle Bracket. Its inner end is supported by

a $\frac{1}{2}$ " Reversed Angle Bracket bolted to the Strip 5.

For the winding handle to control the movement of the load hook use a Crank Handle and join to it a $1\frac{1}{2}$ " Rod by a Rod Connector. Tie a length of Cord to the Crank Handle, pass it over the Pulley on Bolt 8, and then attach a small Loaded Hook.

To make the cab roof use a $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plate, a $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate and two Semi-Circular Plates. Support these by a Trunnion fixed to the back of the cab, and an Angle Bracket bolted to the window frame.

Now fix a Bush Wheel 7 to a Double Angle Strip 1 and to a $5\frac{1}{2}$ " Strip 6 connected to the back of the cab by a Trunnion. In the Bush Wheel fix a 2" Rod, and fit it with two Wheel Discs and a Cord

(Continued on page 508)

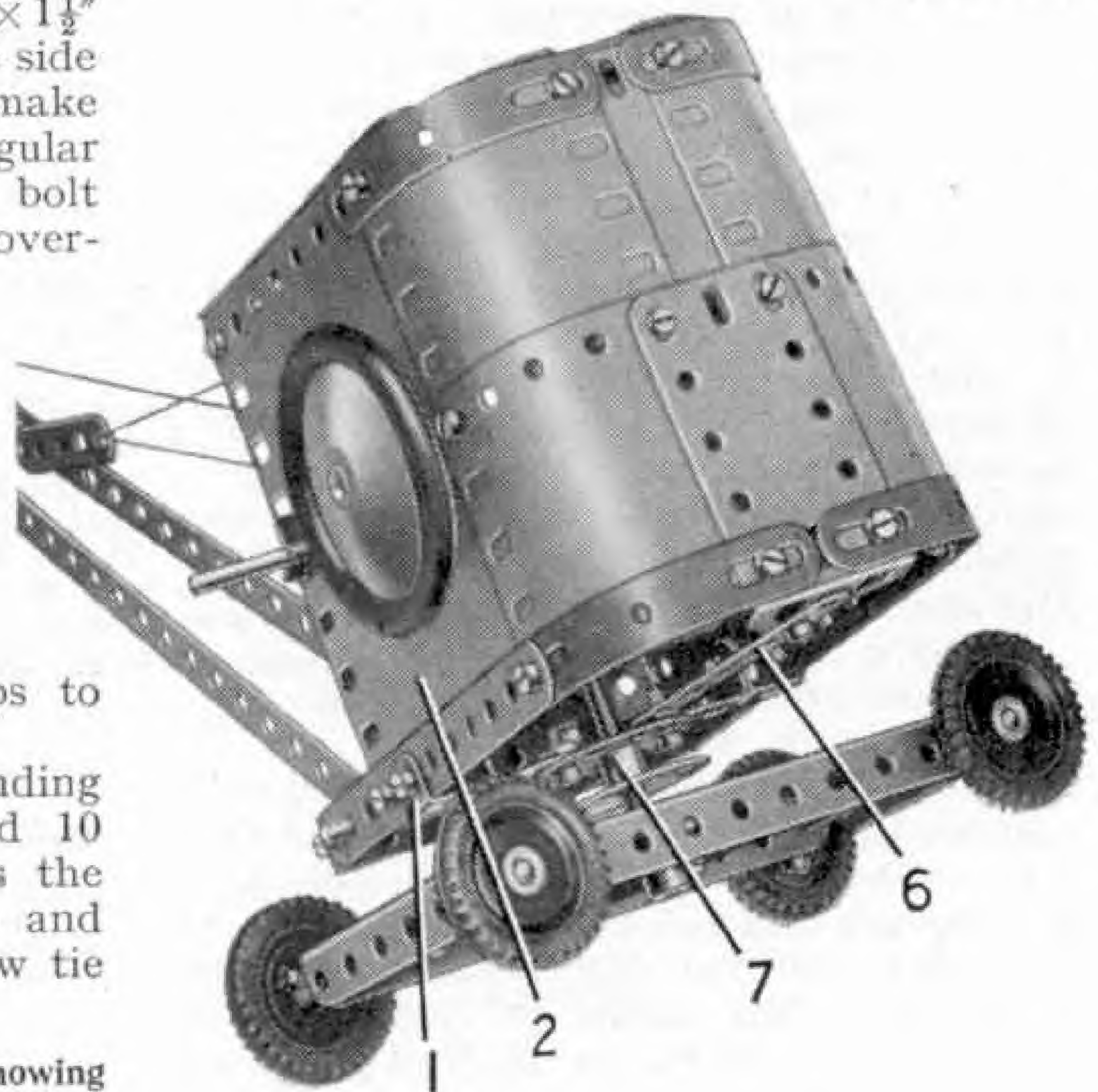
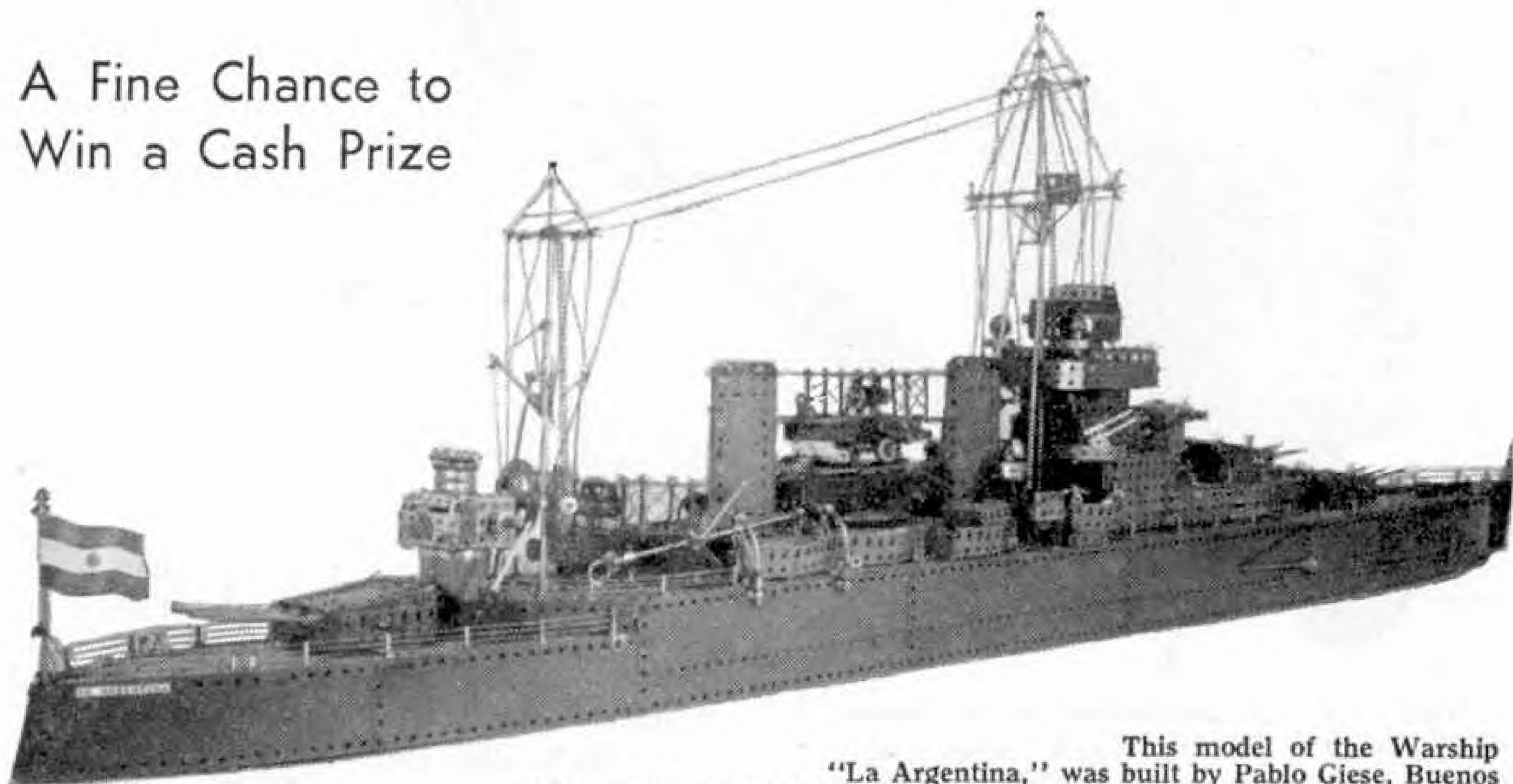


Fig. 3. Another view of the mobile crane showing how the cab is pivoted to the wheeled base.

Meccano Model-Building Competition

A Fine Chance to
Win a Cash Prize



This model of the Warship
"La Argentina," was built by Pablo Giese, Buenos
Aires, and contains many constructional features of special interest.

LAST month we announced the first of the main autumn and winter model-building competitions, in which we are offering fine cash prizes for the most original and best-built Meccano models of any kind. This Contest will remain open for entries until 31st December, and as there is still plenty of time to prepare and submit entries, we are repeating the details for the benefit of any readers who may have missed seeing the original announcement.

Everyone who owns a Meccano Outfit is eligible to take part in this Competition. It does not matter how old you are, or where you live. All you have to do is to think up a new model of some kind, and then set to work to construct it as neatly and realistically as possible from standard Meccano parts.

When you have completed your model the next thing is to obtain either a photograph or a good sketch of it and send this to us. *The actual model must not be sent.* If you cannot obtain a photograph and you are not much good at sketching, you can ask a friend to make a sketch of the model for you, but the model itself must be the result of your own unaided efforts.

The Competition will be divided into two Sections as follows. A, for competitors under 14 years of age; B, for competitors aged 14 years or over. A separate set of prizes as announced in the accompanying panel on this page will be awarded in each Section.

The judges will award the prizes for those models that are the most original in subject, well proportioned, and built on correct mechanical principles.

You will find it a good plan to choose a model that "works" or may be put to some practical use, rather than one that is merely static.

When building your model keep in mind the new parts that have been added to the Meccano range recently. Perhaps you already possess some of these, and if so you should try to find novel uses for them in your

model. In any case you will find them very useful in making your model realistic.

Before posting your entry take care to write your age, name and full address clearly on the back of each photograph or drawing. You should address the envelope to "September Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13."

"SEPTEMBER" MODEL-BUILDING CONTEST THE PRIZES

The following prizes will be awarded in each of the Sections A and B:

First Prize - Cheque for £4.4

Second Prize - Cheque for £2.2

Third Prize - Cheque for £1.1

Five Prizes each of 10/6

Five Prizes each of 5/-

Certificates of Merit also will be awarded.



Club and Branch News



WITH THE SECRETARY STARTING A CLUB

Meccano Guild and H.R.C. members who have no Club or Branch near enough for them to attend, and have been wondering whether or not to try and start one themselves, should act now, as this is the best time of the year in which to form a new Club or Branch. The prospect of the long winter evenings ahead is an added incentive in deciding members who may be approached to give a hand in getting a Club or Branch going. I am always pleased to supply lists of Guild and H.R.C. members in a given locality so that they can be approached with a view to banding together to start a Club or Branch. Meetings can be held at the homes of members, on a rota basis, until the membership has grown large enough to justify obtaining an independent Club or Branch Room.

Write and tell me if you think you can start a Club or Branch, and I will send you copies of special booklets explaining how to do this.

H.R.C. BRANCHES RECENTLY INCORPORATED

- No. 551. HALE END (LONDON)—Chairman: Mr. L. Coe, 463 Hale End Road, Highams Park, London E.4.
No. 552. CONSETT Y.M.C.A.—Chairman: Mr. D. Osborne, 22 Summerhill, Shotley Bridge, Consett.
No. 553. SWINDON MODEL RAILWAY CLUB—Chairman: Mr. W. G. Robinson, 40 Ponting Street, Swindon, Wilts.

CLUB NOTES

LAUNCESTON—An outing to Laneast Moor for the flying of model aircraft was much enjoyed, in spite of a strong wind that limited flying activity. Interesting talks have included one on *Photography* given by Mr. Bawden, the Assistant Leader, and one on *Tools* by Mr. Roberts, a good friend of the Club. Club roll: 45. *Secretary*: J. R. Keast, Lytham, Dunheved Road, Launceston.

CONSETT Y.M.C.A. M.C.—A large hammerhead crane built by the members and shown at a recent Exhibition attracted great attention. The Club will have an excellent display of Meccano models at the Consett U.D.C. Exhibition. Several members have visited a colliery to obtain data for the construction of a model colliery. Club roll: 23. *Secretary*: J. N. Barron, 4 Garden Place, Leadgate, Consett, Co. Durham.

INDIA

MYSORE M.C.—A visit to the Krishnarajendra mills, Mysore, greatly interested the members. The Club has acquired a 16 mm. sound projector, and with it film shows on engineering topics have been held. An excellent Club Exhibition that included a good display of models took place recently and was opened by Mr. V. L. D'Souza, B.A., Vice-Chancellor of Mysore University. *Secretary*: Mr. M. N. Radhakrishna, 579 Dewan's Road, Mysore, India.

BRANCH NEWS

CHINGFORD NEW ROAD SCHOOL—A party of members greatly enjoyed a visit to an Exhibition of British Railways equipment. This Branch meets on Tuesday and Friday evenings, and a cordial invitation is extended to any H.R.C. member in the district who has not yet joined the Branch. *Secretary*: G. Paton, 2 Bernwell Road, Chingford, London E.4.

HALE END—Interesting operations on the Branch layout are carried out at each meeting. Talks and discussions, illustrated with sketches and photographs, are also very popular. It is planned to start a Branch magazine. *Secretary*: A. L. Coe, 463 Hale End Road, Highams Park, London E.4.

STAINLAND PROVIDENCE—The Branch has lost three active and prominent members by the removal to Dover of the Chairman, the Rev. H. Rex Coombs, and his two sons. The Branch extended a cordial welcome to their new Chairman, Mr. Claude Robson. *Secretary*: G. Parkin, 3 Beech Street, Stainland, nr. Halifax, Yorkshire.

EAST GRINSTEAD—Work on the new layout is well advanced, and construction of stations, houses, shops, etc., is in hand. The scenery experts also are very busy. Signalling is fully electrified and controlled from three signal boxes. *Secretary*: B. H. Heasman, 69 Woodlands Road, East Grinstead, Sussex.

CONSETT Y.M.C.A. —Indoor activity has been concentrated on completing the track and lineside on the layout to be used at the Consett U.D.C. Exhibition. Interesting visits have been paid to a coal preparation plant and a silica brick works. *Secretary*: D. Trout, 66 Sherburn Terrace, Consett, Co. Durham.

KENTISH TOWN—A large locomotive depot has been designed and included in the Dublo layout, and a turntable has been made. The Branch library continues to be increased. *Secretary*: J. A. Kirby, 9 Busby Place, Kentish Town, London N.W.5.



This excellent photograph of officials and members of the Launceston M.C. was taken on the occasion of a very interesting talk on miniature waterline ship models by the Rev. R. Cullington, seen in the centre of the picture. Mr. B. Tunbridge, Leader, is seen on the extreme left, and R. J. Keast, Secretary, is third from the right at the back.

HORNBY RAILWAY COMPANY

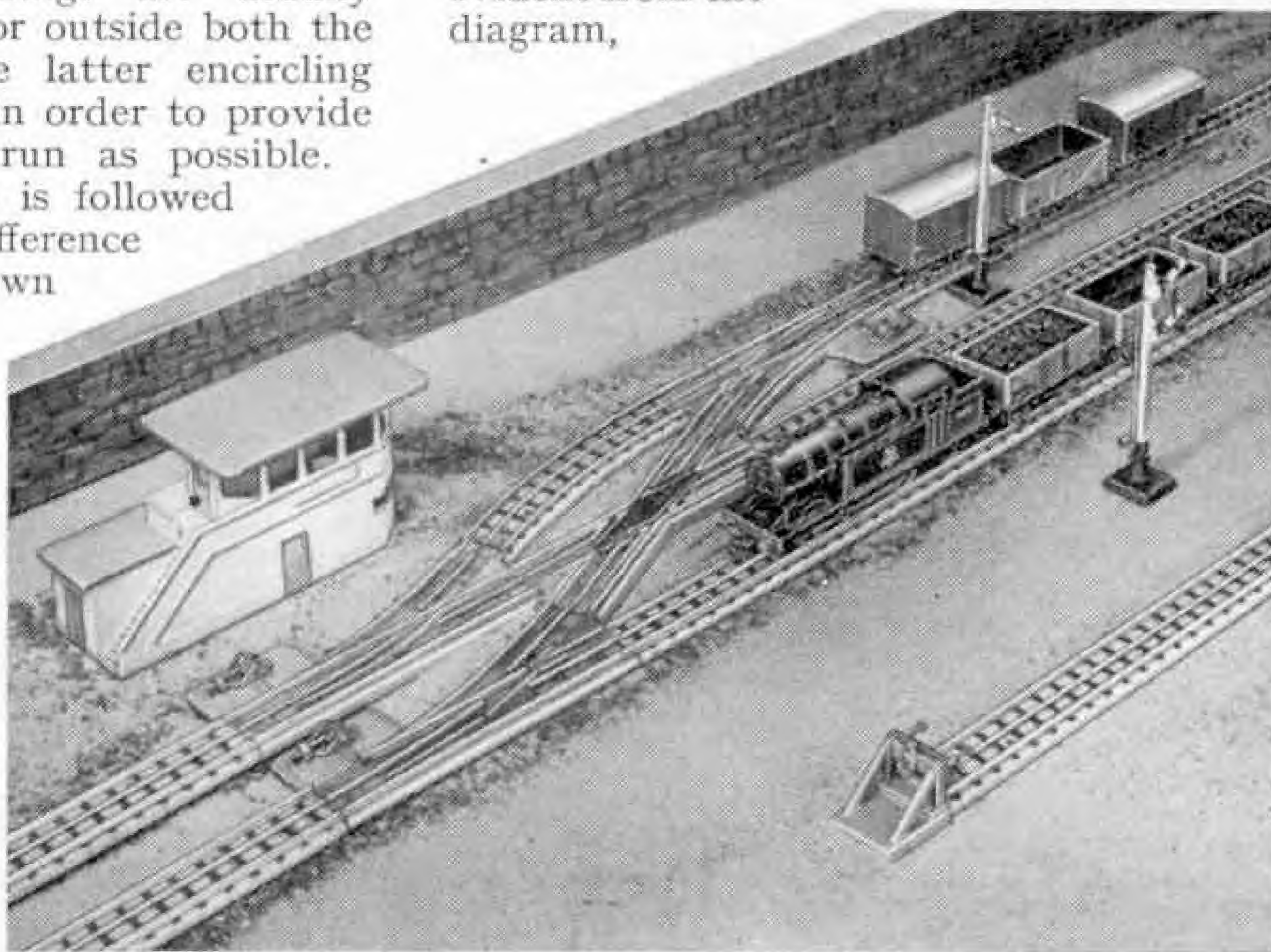
By the Secretary

Crossings, Sidings and Loops

I EXPECT that at one time or another most of you have wished to connect a siding to the up and the down tracks of a double main line. On some layouts this can be done by simply placing the siding between the two main lines, but this means that the two running tracks have to be further apart than usual. It is not always possible to allow this, owing to space restrictions or other layout requirements.

For this reason sidings are usually arranged either inside or outside both the main oval tracks, the latter encircling the rest of the layout in order to provide as long a main line run as possible. Whatever arrangement is followed does not make any difference to the useful scheme shown in the picture and diagram on this page.

An interesting view showing the Hornby-Dublo Diamond Crossing used in conjunction with Points to connect a siding with both up and down main lines.



Here we have a siding—it may be a loop if necessary, if you wish to have one—made as long as there is space for it, that is connected to the nearest main track in the usual way by means of Points.

For some time Hornby-Dublo owners have been used to the idea of using two further Points to form a crossover between the two main tracks, and thus to connect the siding to the inner main track. Since the advent of the Hornby-Dublo Diamond Crossing this rather cumbersome arrangement is not necessary, and the scheme shown will I am sure appeal to all Hornby-Dublo enthusiasts. This still

involves the use of two additional Points, as did the older arrangement just referred to, but these are used as shown in conjunction with the Diamond Crossing so that a neat and compact arrangement results. The scheme saves length too, which can be valuable where space is restricted.

There is no need to deal in detail with the track arrangements, as these are quite evident from the diagram,

but a word or two on the electrical arrangements may be useful. Where only a single train has to be catered for, and the whole layout is supplied from a single Transformer and Controller, the position is straightforward enough. And there is really no more complication if the electrical equipment is duplicated, so that each main track has its own power supply and Controller, and two trains are to be run.

The fact that the two intersecting routes at the Crossing are electrically separate is a considerable help in situations of this kind,

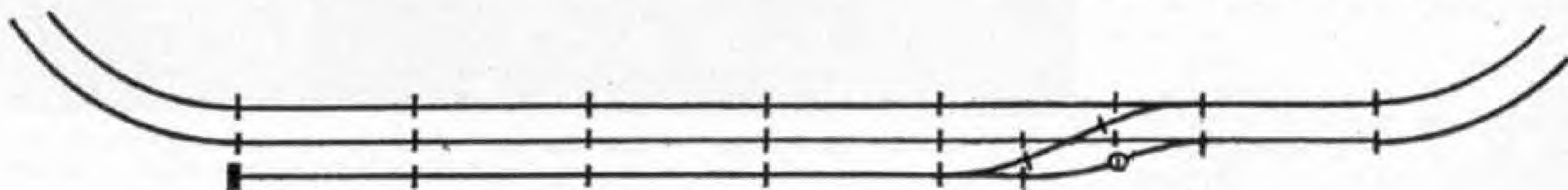
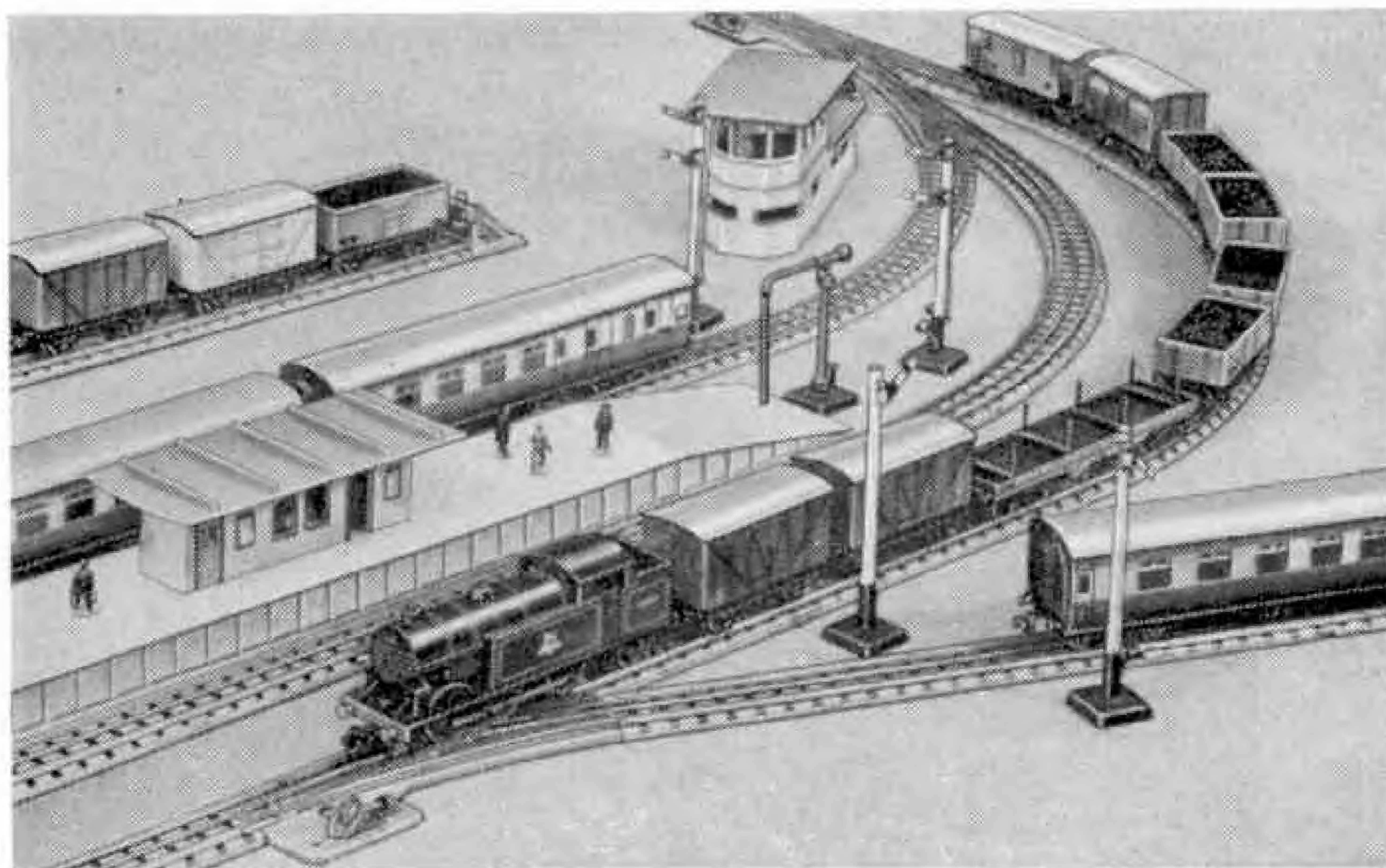


Diagram including the useful formation shown in the upper illustration.



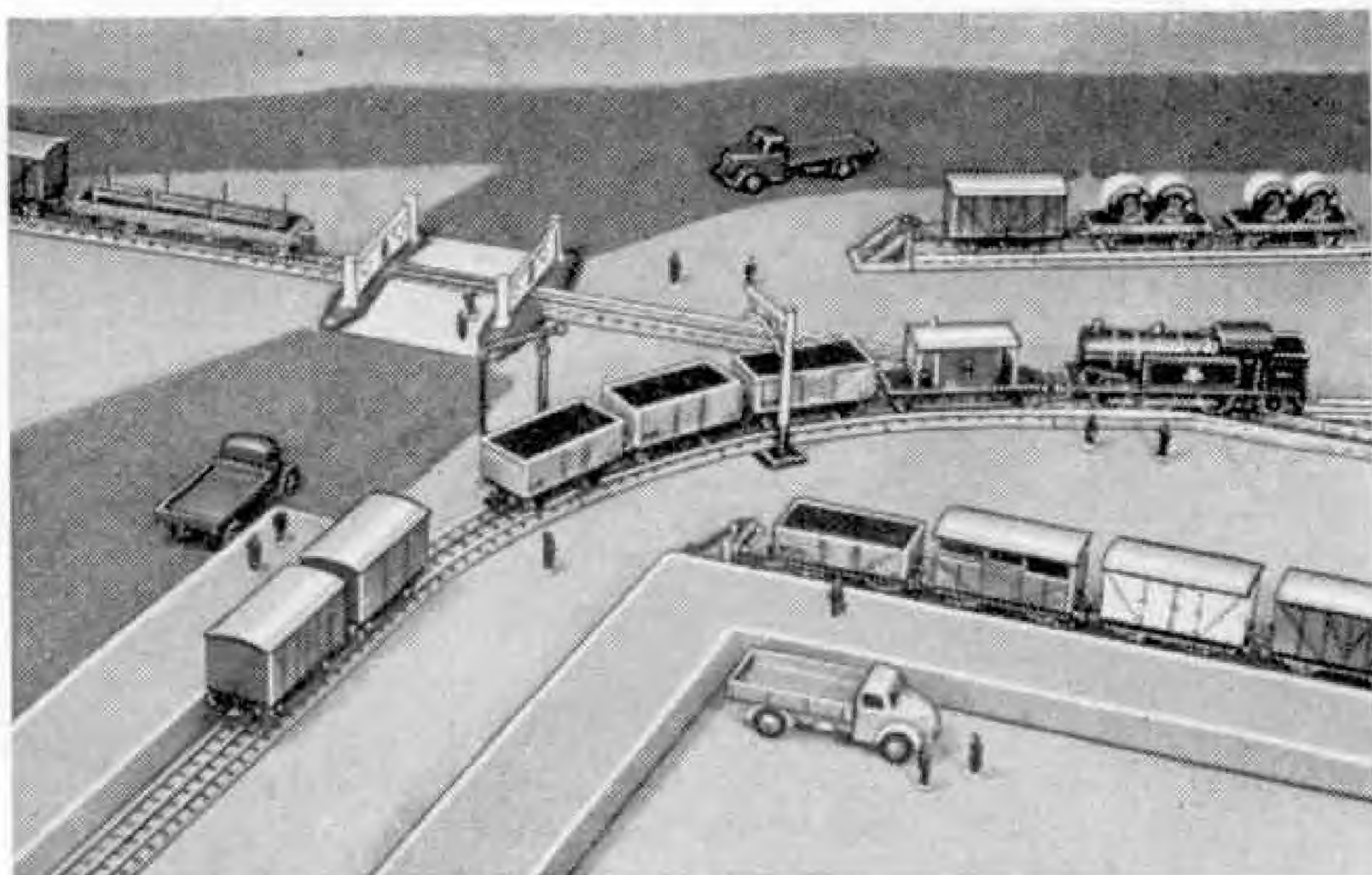
An effective station view in which the curving approach tracks show to advantage. The train running in is on an avoiding line.

Now for some even more exciting news, which I am sure you will all be glad to hear. During the next few months I shall be describing developments in the Hornby-Dublo system that will be taking place, or that may

for there can be no interference between a train on the main line route and one that is on the intersection leading to the siding. When Isolating Switch Points are in use it is necessary to incorporate an Insulating Tab, as shown by the small circle with bar, in order to prevent any complication that might occur between the circuits. If Electrically Operated Points are used, an Isolating Rail must be placed at the facing end of the inner set of Points in the siding, as well as the Insulating Tab.

Next a word on another type of Crossing, the Hornby-Dublo Level Crossing, with which you are all familiar. Those of you who have bought Hornby-Dublo Train Sets recently will have among the rails in these Sets a Straight Half Rail provided with a built-up roadway between the running rails. This is specially for use in conjunction with a Level Crossing, providing a smooth passage from side to side over the railway track. Hornby-Dublo permanent way engineers will welcome this introduction, because it completes their system in a neat and realistic manner. Dinky Toys motor drivers as well will welcome it, as it affords their vehicles an easier passage across the railway than has been the rule up to now.

already have been introduced before I write. Needless to say I am looking forward to this. Included among these new items will be a new locomotive, some new rolling stock and a most useful addition in the shape of the Electrically-Operated Uncoupling Rail. The new engine is a remarkably realistic representation of the B.R. Standard 2-6-4 tank type, and there will be appropriate suburban compartment type coaches to run with it. With the addition of the Electrically-Operated Uncoupling Rail remote control on a Hornby-Dublo layout will become complete. There will be more good news, too, for those who have to use an accumulator or even dry batteries to run a Hornby-Dublo train, as well as for those who wish to extend and develop their stations.

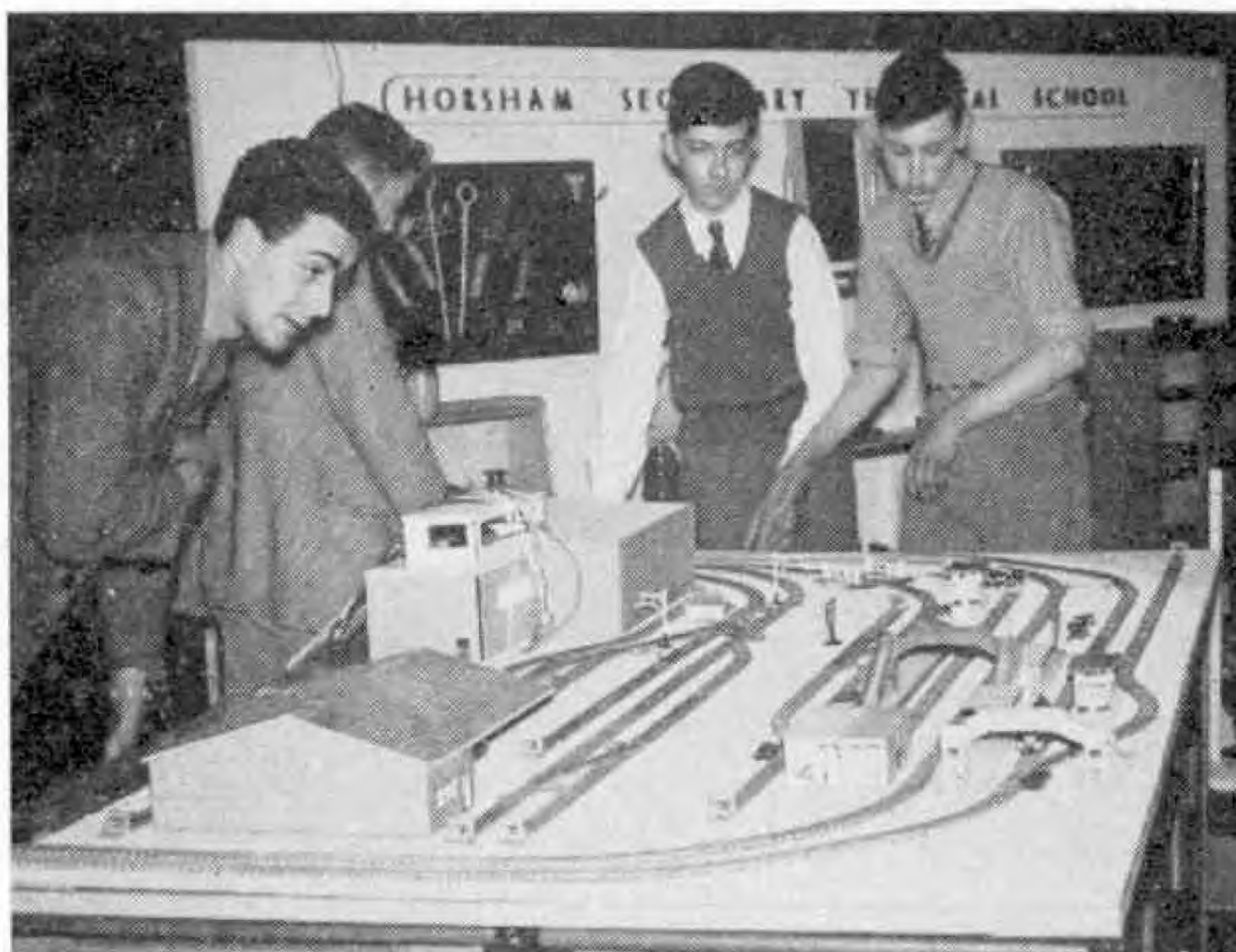


An unusual combination of road and rail features. The Level Crossing is used in conjunction with the EDBX $\frac{1}{2}$ Rail referred to in this article.

An Exhibition Layout at Horsham

SOME months ago the four members of the Horsham Model Engineering and Flying Club whom you see in the upper picture here combined to put together a Hornby-Dublo layout that formed a prominent feature at a Club Exhibition. The system was arranged to cover an area 8 ft. long by 7 ft. wide, and the baseboards supporting the track provide a well or pit for the operators.

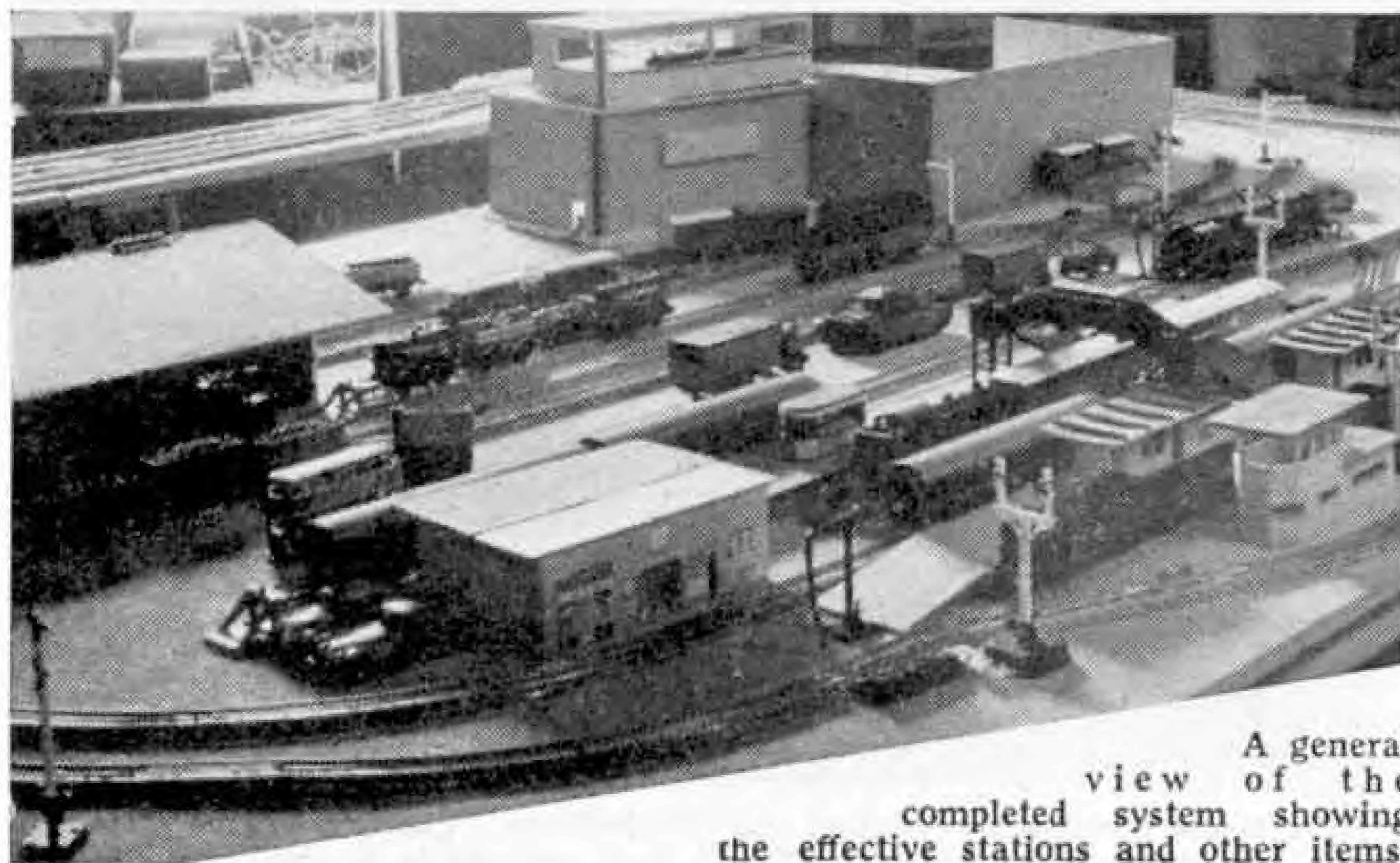
Although the layout as a whole was a joint affair, two members of the group made themselves responsible for the wiring of the track. This was no small job, because two power units and two Controllers were in use and there were seven separate isolating sections. In addition, Electrically Operated Points and Signals were used. As is usual for exhibition work, some of the Signals and Points were wired to operate together, although this is not strictly in accordance with railway practice.



A critical moment during the first running test at the exhibition of the Horsham Model Engineering and Flying Club. The four members responsible for the layout are, left to right, David Piggott, Victor Maskell, Philip Shoulders and Gordon Holmes.

Hornby-Dublo locomotives and rolling stock were used throughout, and 12 engines, including five Duchesses, were available to work the traffic. The railway was well provided with coaching stock, too. There were 16 vehicles, with which several set trains were assembled, in B.R., L.M.S., and L.N.E.R. liveries respectively. Goods stock was well varied and a total of some 60 wagons was in use. Of these there were as many as 10 Goods Brake Vans, a useful provision for exhibition work where the ability of a made-up train to run in either direction, and therefore with a Brake Van at each end, is very useful at times to the busy operator of an extensive layout.

As is usual with such efforts where trouble and time are taken in planning and installation, everybody had a good time when actual running began, and members are to be congratulated on the success of their effort. The originator of the scheme, who planned the layout, was *M.M.* reader Gordon Holmes, the Secretary of the Railway section of the Horsham Club, who tells us that more members are wanted.



A general view of the completed system showing the effective stations and other items.

Variety in Open Wagons

IN our recent talks on the rolling stock and locomotives of the Hornby System we have had something to say about both passenger trains and the more important types of freights, such as parcels and van trains of various kinds. Naturally these take an important place in our running arrangements, but we must not forget the more ordinary goods trains, the varied traffic of which is carried largely in what can be generally classed as open wagons. In the Hornby System there are a number of wagons that answer to this description, and almost any layout is bound to include several of them. They have many uses in miniature, as in real practice, so let us see what we can do with them on our own railways.

Probably the most common vehicle to be seen in the course of a rail journey is the ordinary open wagon. This type is well

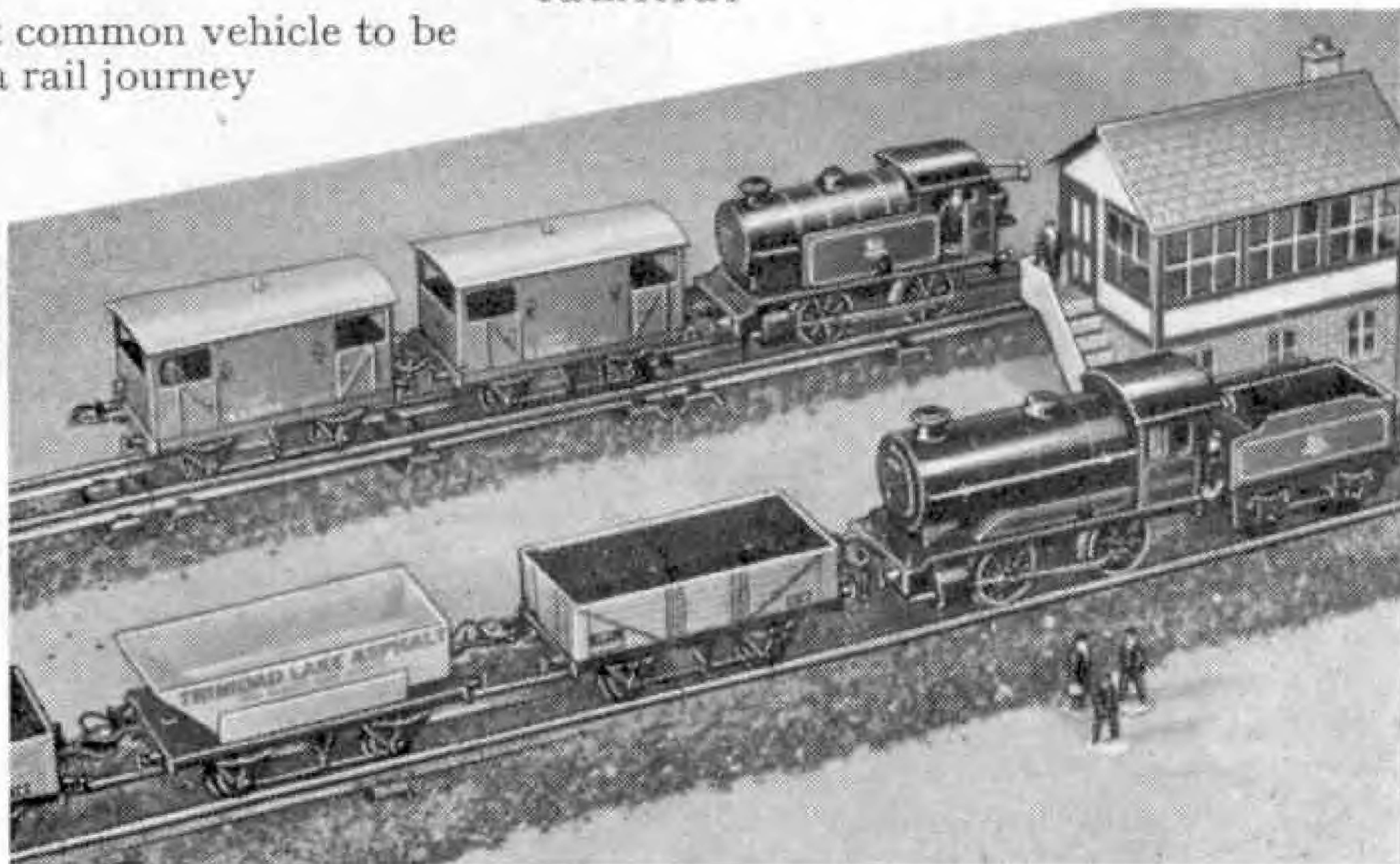
Empty wagon traffic, a necessary part of operations even on a Hornby railway. On the further track are two Goods Brake Vans required elsewhere down the line.

represented in the Hornby System by the familiar Wagon No. 1. In its new B.R. grey livery it is a smart vehicle carrying details regarding its tonnage, its number and tare weight in white figures on characteristic black background. Here is a Wagon that can appear in almost any Hornby freight train, except the most important express ones. General goods, and such things as coal and many other loose loads, travel in open wagons and equally wide employment can be found for the No. 1 Wagon on a Hornby layout.

Apart from the use of Wagon No. 1 in actual running in trains, it is possible to give quite a realistic look to miniature sidings or a goods yard by leaving one or two wagons of this kind close to the Buffer Stops. They can be assumed to be in process of loading or unloading, or to be simply waiting until required. Whatever

the situation represented, Hornby railway owners will not find it difficult to provide suitable items of merchandise and an appropriate set-up of Dinky Toys figures and a motor vehicle or two. A good deal can be done in this way in miniature and a Gauge 0 layout provides a very suitable field for this sort of thing. There is good scope for actual loads and a scene can be built up in a more convincing manner than is possible in smaller scales.

The other types of open Wagons in the Hornby System are more specialised in character, for each embodies some particular feature of body construction that aids the discharge of its load. There is of course the familiar



Hopper Wagon. This stout four-wheeler has two quick-release doors operated by a short handle projecting from the solebar on one side. For coal and mineral traffic it is just the thing, while some miniature railway owners use it in connection with ballasting operations on their railways.

Finally, we have the tipping type wagons, of which there are two Hornby representatives. One is the well known Side-Tipping Wagon, the body of which is specially shaped, and is so suspended that the load can be tipped in bulk to either side of the track. The other is the Rotary Tipping Wagon, on which the body can be rotated as well as raised, so that loads can be discharged in almost any direction. A train of the wagons could be running to a building site with materials for road and yard surfacing.

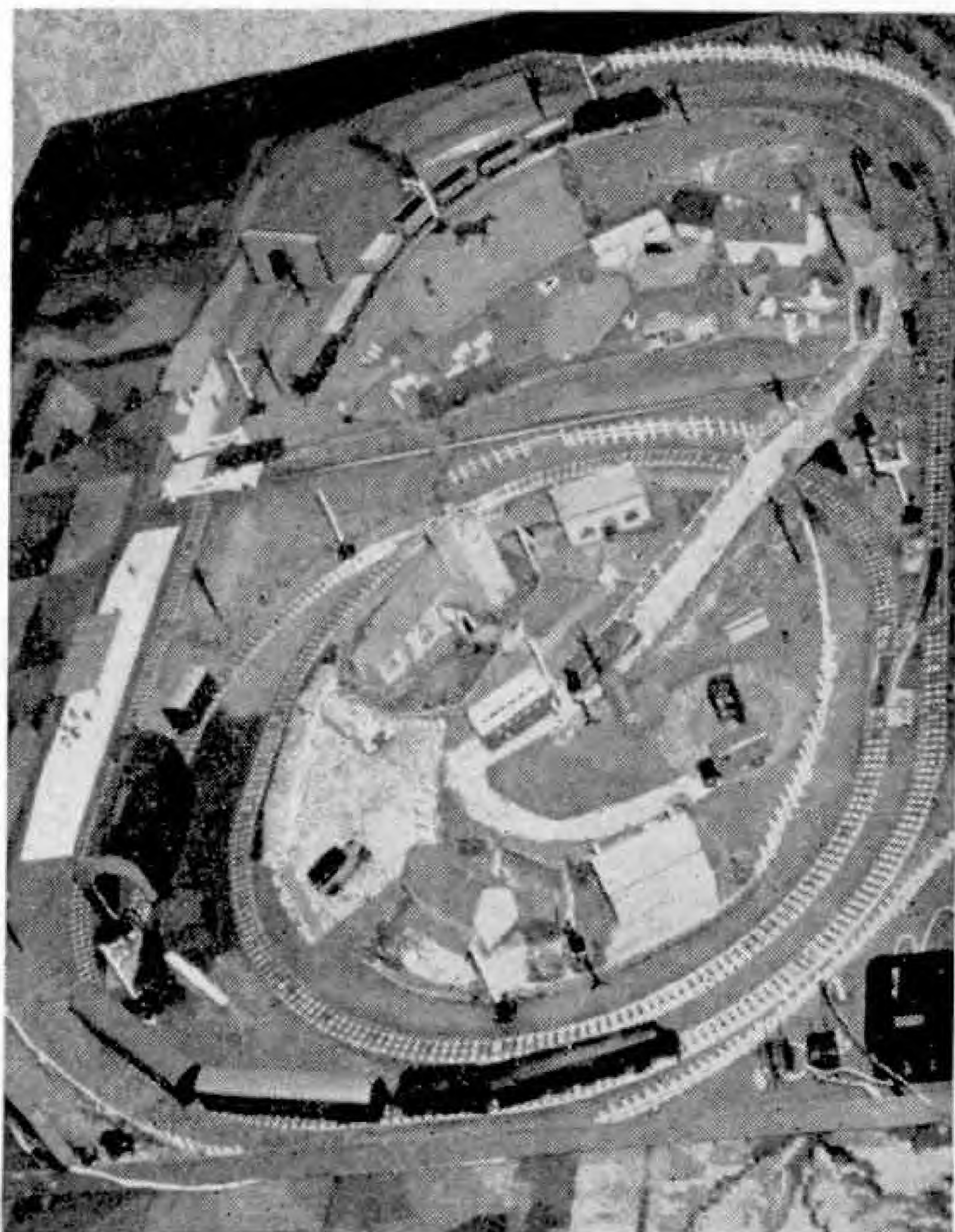
Progress on a Hornby-Dublo Layout

IT is always interesting to watch an individual miniature layout grow, and looking on must have been particularly fascinating with the system seen in the illustration on this page. This is an aerial view of the Hornby-Dublo layout of Mr. A. F. Greenman of Oxford, which many of you will remember from previous references in the *M.M.* Like many other layouts nowadays, this is arranged on a baseboard, which the requirements of storage have caused to be made in two parts.

Following our brief notes in these pages last month on baseboards, it is interesting to note that in this example the track plan is so arranged that only the two sides of the main single track oval cross the joint between the two sections. This removes what is sometimes a major headache in the arrangement of a portable board in sections.

The way in which the track is carried over the joint is a good one, which is often used and deserves to be known more widely. The track is laid so that Straight Quarter Rails, which are detachable, form the joining sections. As the other rails necessarily stop short of the joint where the two sections of board butt together, there are no projecting ends liable to damage in handling and storage. This scheme should be helpful to many who are thinking about the installation of a layout, but have not the space to accommodate a fair-sized board permanently.

Like most miniature railway owners, Mr. Greenman feels that there is still plenty to be done to his system, although many enthusiasts would be quite satisfied with the layout as it is. The extensive track layout has not required much modification, but the Level Crossing is an important addition. This addition led naturally to others, for the presence of a level crossing on the track implied that there should be a road. So one was made! Signalling has



Looking down on the portable Hornby-Dublo layout of Mr. A. F. Greenman, Oxford. The distinctive features of the "countryside" through which the line passes can be distinguished clearly in this bird's eye view.

been improved and to keep pace with this a Signal Cabin has been added, while telegraph poles are an additional refinement not often found on small-gauge railways.

Actually telegraph poles are not often found on road layouts either, although they are such familiar features of the countryside. Miniature telegraph poles can be bought, but they are not really difficult to make if one has the necessary patience. Matchsticks come in useful for the cross-bars, and the thin dowel rod that you can buy at hobby shops or woodwork stores is good for the main poles.

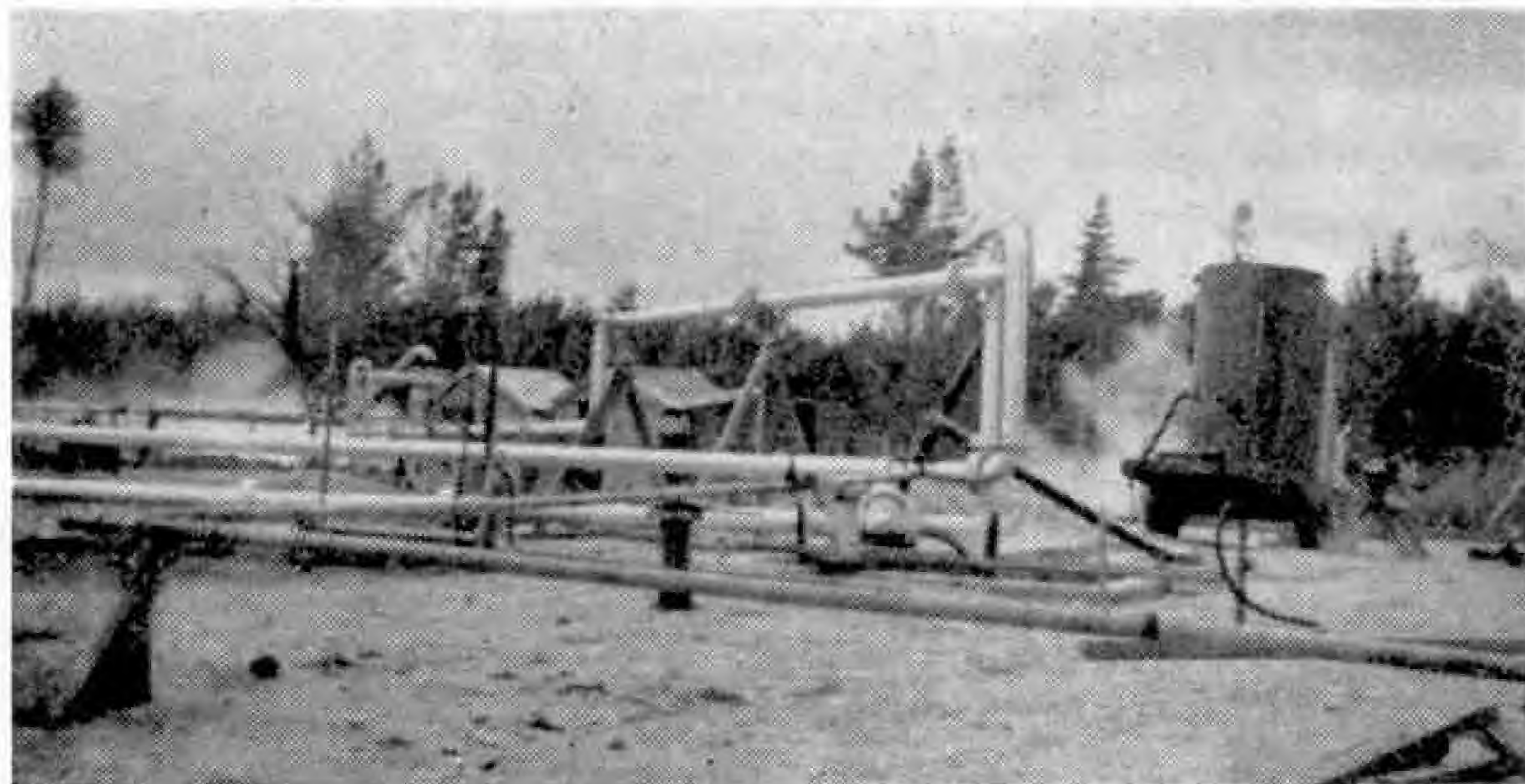
Special attention has been given to the lineside buildings, including the station, and a lighting system has been installed. Altogether the layout forms a nice piece of miniature landscape, well-populated with appropriate Hornby-Dublo figures and well provided with Hornby-Dublo rail and Dinky Toys road transport. The pleasant appearance of the whole scene as well as the atmosphere of activity are brought out clearly in the photograph reproduced above.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

GEO-THERMAL STEAM

While we were making our way by car from the north of New Zealand to Wellington to board a liner for England, we decided to take the route around Lake Taupo. Nearing the Lake, along the rough



A station near Lake Taupo, New Zealand, where metals are tested in volcanic steam. Photograph by P. Robinson, Bournemouth.

gravel road known as "The Desert Road", we passed a fenced site on which were several huts and masses of pipes, with steam issuing from some of them. A notice told us that it was a station for testing metals in geo-thermal steam in connection with New Zealand's experiment in providing power from it. This steam is very corrosive and the purpose of the testing is to find a metal to withstand this effect.

A little farther on we came to a road leading away to the left, which we followed until we came to a dead end. On one side of the road was a huge pipe about two feet in diameter, with a continuous jet of steam thundering out with a noise like wave on wave of heavy bombers. Over the trees on the other side hung plumes of steam.

We retraced our way along the road. Five minutes after we had arrived back on the main road an old car came round a corner. Just as it was passing us we were astonished to see the radiator cap fly off and a cloud of steam spurt up. A strange coincidence!

Lake Taupo, which has an area of 238 square miles, is the largest lake in New Zealand. The thermal spring district on its northern coast is not so well known as that in the Rotorua district. There are hot springs in the lake as well as in the adjacent area. The Waikato river flows out of the lake. Rotorua is about 40 miles north of Lake Taupo, the thermal region extending over several thousand square miles of North Island.

P. ROBINSON
(Bournemouth).

A RAILWAY TRIP IN SIERRA LEONE

I travelled on the Sierra Leone Government Railway from Freetown to Daru, a military training centre fourteen miles from Pendembu, the terminus, with my parents and sister in the summer of 1951. On the *Pendembu Flyer* we pulled out at 7.15., first trundling through the streets of Freetown at walking speed and then passing through small towns. Early in the journey we crossed several river valleys on bridges that seemed to be supported by a series of giant pylons. They seemed perilously narrow, and gave one a singularly insecure sensation.

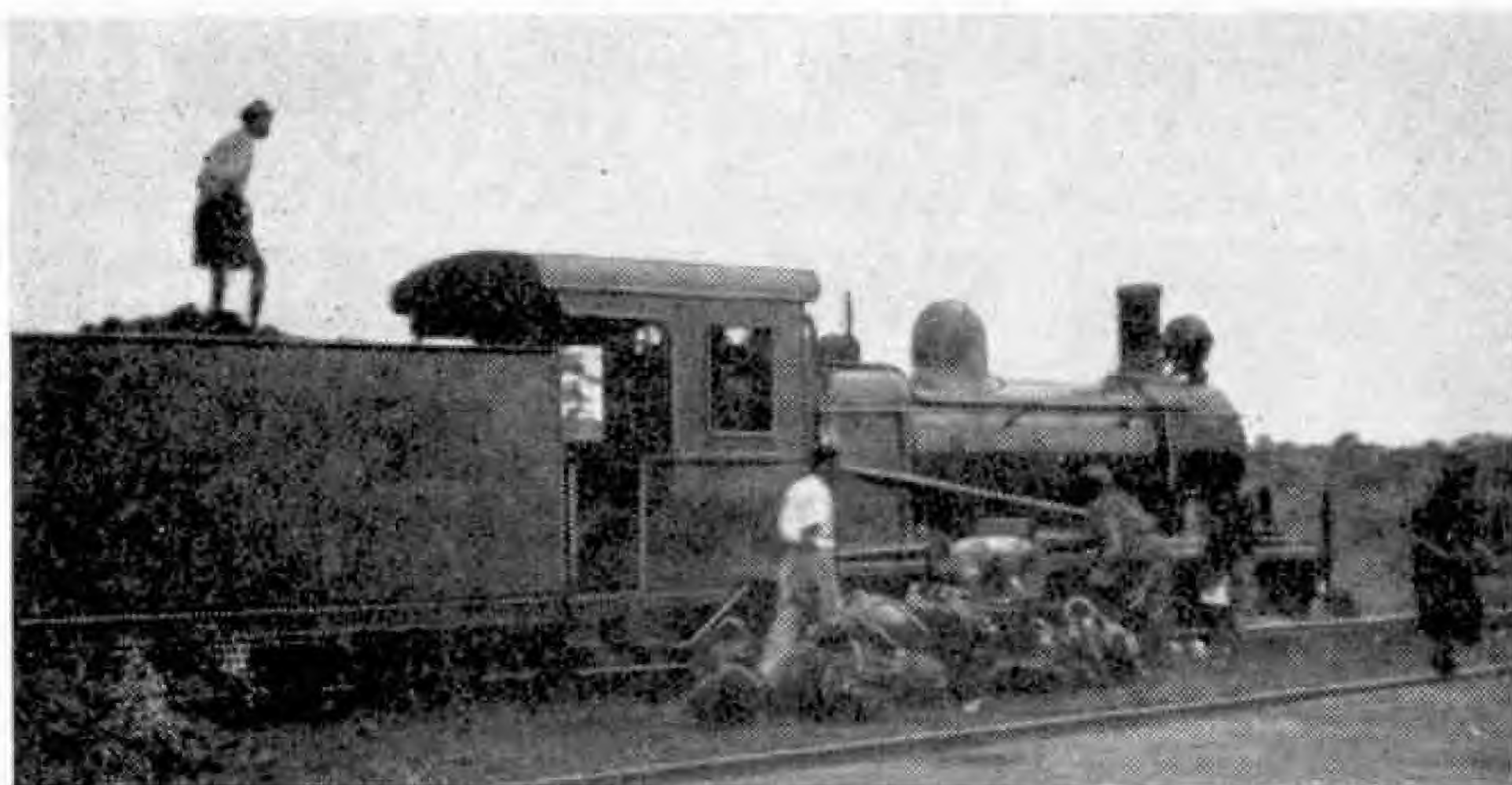
It was late in the afternoon when we arrived at Bo, the capital of the Protectorate, 136 miles from Freetown. As it began to get dark the jungle seemed to get denser and nearer to the track. When it was dark a powerful headlamp was turned on to warn of the train's approach, and to clear the track of animals. We reached our destination at 9.0 p.m., after a 14-hr. journey that we found an enjoyable

change from railway travel in other parts of the world.

The *Pendembu Flyer* runs every day except Sunday, up on Monday and down on Tuesday, and so on. The train's average speed, including stops, was 16 miles in the hour and it was invariably punctual at the halts. The goods trains travel much more slowly than the Flyer, which has priority on the line; the former have a braking system throughout the whole train.

There are no bridges or tunnels on the railway, and where a road crosses the line there are no gates, not even in Freetown, where a certain amount of shunting goes on in the streets. Beside the track are metal telegraph poles, each numbered, and every mile from Freetown is marked.

J. YOUNG (Wellington College).



A locomotive of the Sierra Leone Government Railway. Photograph by J. Young Wellington College.

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For other Stamp Advertisements see also pages 506 and xx

Stamp Collectors' Corner

By F. E. Metcalfe

THE YUGOSLAV ANIMAL KINGDOM

If you don't spell the name of this fascinating country as is done in the heading, don't be sure that I am wrong for doing so, for I have only copied the official title of a wonderful set of stamps issued quite recently. I'll deal with the set in detail, later on, and well worth dealing with it is, but before doing so, just a word about Yugoslavia, or Jugoslavia—take your pick—and the stamps it has produced in the past.

Perhaps some of the crudest stamps ever issued, if we except those of Afghanistan and Indian Native States, were those of Jugoslavia after the first World War. These stamps were dubbed "chain-breakers" by collectors, but they were tremendously popular at one time, and still are with many, because they are so full of varieties. And of course that is what the philatelist is after. There were a number of printings, with many flaws for the happy band of those who like such things.

This Adriatic country has gone a long way since then. A number of fine sets have appeared, but it has been left to that world-famous firm of printers Messrs. Courvoisier, of La Chaux-de-Fonds, Switzerland,

to prepare for them a set that has really set thematic collectors right on their toes with excitement! The issue has been officially described as "Postage Stamps with designs from the Yugoslav animal kingdom," and the writer at least had a surprise when he noticed in it one animal that apparently exists in that country that he had not thought to be European at all.

The set consists of 12 values, from 2 din. to 100 din. The many thematic collectors who will go in for this set will be interested in brief details of each value, so here is a short description.

The 2 din. shows a ground squirrel. This is to be found in Macedonia and on the plains lying north of the Save-Danube line. Like all squirrels, it hibernates, but in the ground.



It is the next value, the 5 din., that gave me a surprise, for in my ignorance I did not know that such an animal as the lynx existed in a wild state so near home. It is not a very big animal, but is exceedingly strong, and it is claimed that it can bite right through the neck of a deer. It is much sought after for its pelt, which varies from a greyish-sorrel to sorrel. Besides being a speedy animal on the ground, there are few trees it cannot climb. All will recognise the



on a Yugoslav stamp, no doubt there are many inhabitants of that country who have never seen a specimen in a wild state, or want to.

These bears have very great strength and can easily kill animals as large as horses. Like the squirrels they hibernate. As for food, they are not fussy; chestnuts, acorns, strawberries, or a loose cow, all come alike. In spite of their clumsy appearance, they can climb well, and do a turn of fast running, if needs be.

The 17 din. shows that delightful animal the chamois. The writer remembers a very famous broadcaster coming to him one day in Budapest, full of excitement, with the comment that he was off to Jugoslavia to "shoot chamois." More shame on you, replied your scribe, and the man got the shock of his life at such an unsporting rejoinder. These agile animals live very high up in the mountains, so it is quite difficult for so-called sportsmen to get at them. They can jump from one rock to another, in leaps of 20 ft. or more, and think nothing of it. Maybe there will come a time when we are sufficiently civilised not to want to kill such beautiful creatures. Then they will soon learn that they are safe, and more will get a chance to see them.

Now for the pelican on the 25 din. stamp. It is to be found on the Macedonian and Montenegrin lakes, and what a fisherman it is! In olden days fishermen used to exploit its ability in this respect.

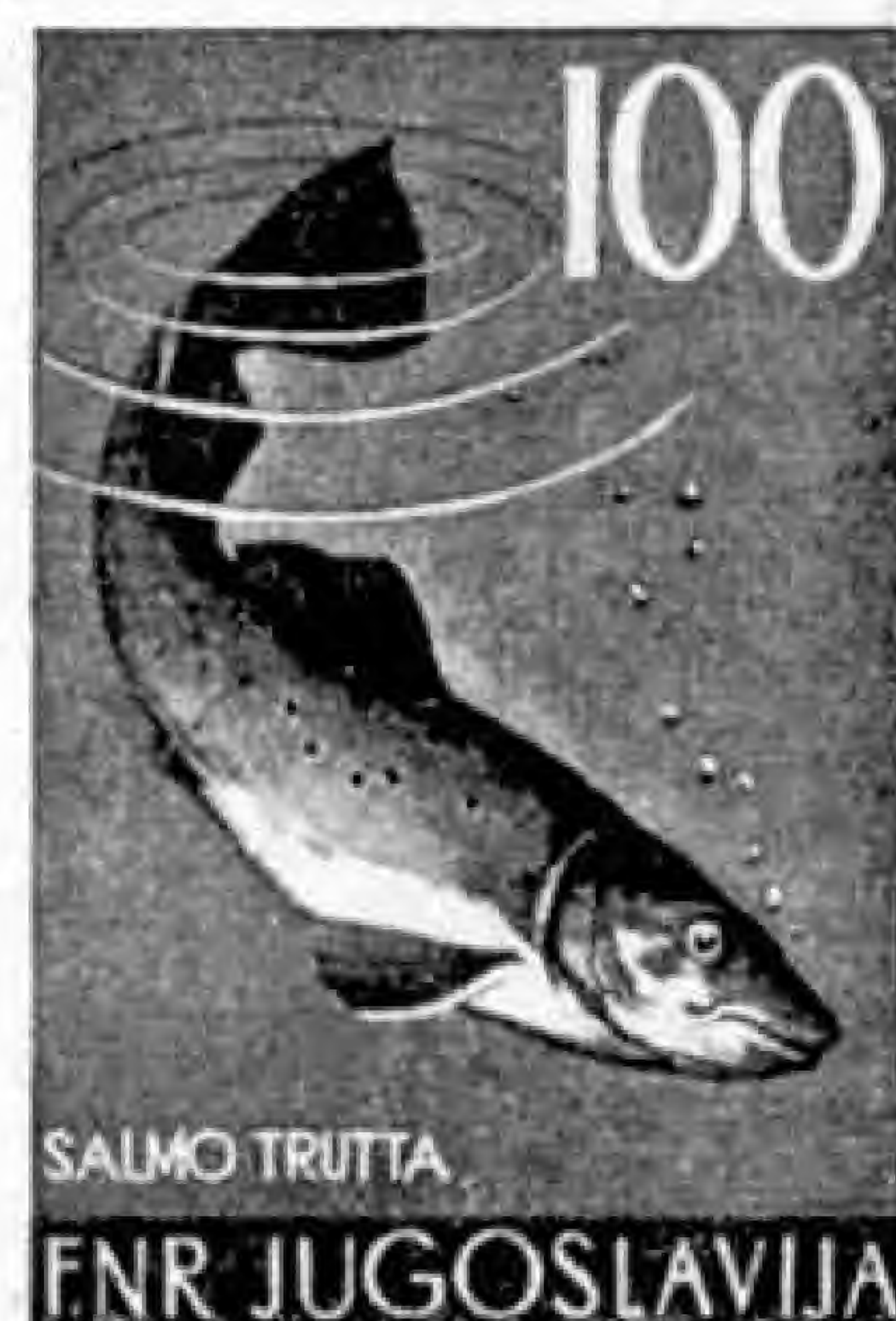
Just look at that fine bearded eagle on the 30 din. stamp. With a wing span of over two yards, it was ruthlessly hunted before the war, but those now remaining have state protection. They are mostly to be found in the high mountains of East Serbia. The name "bearded" comes from the long bristles that grow out under the beak. It can easily carry off a sheep, which is the reason why the peasants tried to exterminate all they could come across.

The next two values illustrate beetles. The one on the 35 din. shows one with the funny name of *Procerus gigas*, one of the largest species in Europe. The next, on the 50 din., is really not a beetle, but an insect, *Callimenus panici*, and is the biggest of its kind in Europe. It is something to its credit that it is said to do no harm.

On the 65 din. we get a very interesting lizard. Black in colour, it thus differs from all other kinds of lizards, and it is of extraordinary (Continued on page 508)

animal on the 10 din., the red deer, which is found in many forests in Jugoslavia. Some of these deers grow a fine pair of antlers, which are shed each year, and many weigh over 25 lb.

Another old friend, though unlike the red deer we don't have him running wild in Great Britain fortunately, is the bear, which grows bigger than any other European grey bear. In Hungary the writer once went with several others on a bear hunt, but alas we did not even see a squirrel, and though this fine animal figures





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Stamp Gossip

GREAT BRITAIN'S "FESTIVAL" STAMPS?

A READER has written in to say that he has been given a 2/6 green stamp of Great Britain that shows an "old wooden wall" and was described as a "Festival" stamp. He asks what is the name of the ship depicted, and what is there of a Festival nature about the stamp?

The ship is H.M.S. *Victory*, Nelson's flagship, and the stamp gets its title from the fact that it was issued on 3rd May 1951, just at the time of the "Festival of Britain". Other values issued were 5/-, 10/- and £1.

There was no connection between the stamps and the Festival. They were just given that name, to pep up the sales perhaps, and both the 2/6 and 5/- values are now rather common, for they are still in use and quite a lot do get used.

STAMP COLLECTING ON A SMALL INCOME

The aim of these stamp articles is to appeal to the average collector, who does not want to spend big sums on stamps even if he could afford to do so, and



who sees in stamp collecting a jolly good hobby, and nothing more. If it is not proposed, from necessity or desire, to go in for an expensive collection,

this does not mean that one should not want as good a collection as can be got for any money spent. All this suggests that a book just published titled *Stamp Collecting on a Small Income* will be of great interest to many. It only costs 2/6 and any newsagent can get a copy for you. It is written by an expert on the subject, Mr. K. Chapman, Editor of *Stamp Collecting*, and the publishers are Hutchinsons. I strongly recommend getting a copy. I have had a lot to do with stamps, and can fairly say that I know something about them. But the book enthralled me and I picked up quite a bit of useful information.

I cannot spare the space to go into details, but the title is sufficient to tell you what the work is about, and at half a crown it is simply given away, when one considers publishing costs today.

AIR STAMPS

Many collectors wish that Great Britain would issue air mail stamps, but it is hardly likely that we shall ever do so, for our Post Office claim that they are quite unnecessary and in this they argue logically. The U.S.A. authorities believe in their utility, and 18th September saw the issue of a 4c value for internal air-postage, postcard rate.

In such a big country as America an air postal service is a necessity. To the many thousands of collectors here in Britain of modern U.S.A. stamps the issue of their air stamp will be quite an event. Fortunately, used copies will be easily come by. A copper will buy one, if you do not come across one for nothing.



value issued by Bermuda in 1942. Previously this stamp had been printed on a dull and rather light blue paper. Great care had always been taken to see that our colonial stamps had been entirely circumspect. Imagine then our surprise when the stamp came out with a most peculiar mottled appearance. Apparently the ordinary blue paper had been coated with ink of deeper blue. This had been badly applied, and the paper now looked mottled.

There was a big rush for the stamp, and copies were soon changing hands at anything up to a pound each, for collectors, ever hopeful, could not believe that there could be many copies of such a philatelic monstrosity. Alas, there were more than was thought, and a copy can now be bought, mint or used—the latter are a bit scarcer—for about 6/-. It was claimed at the time that there had been two printings, one with lines instead of small splashes, but there was no real reason for assuming this.

T.V.

Interested in television? Of course you are, even if you do think that present programmes are not the last word in entertainment. But the subject appeals, as will the stamps issued by Italy earlier in the year to commemorate the introduction of this marvel in their country. Two values are concerned, 25L and 60L, and one of them is illustrated.

I think that there will be many who will want the set. Fortunately about 1/6 will buy one, and about 1/- for used, but if you go in for the latter make sure that you get copies that are not spoiled with unsightly postmarks.

Genuinely postmarked copies of such issues are generally much scarcer, but where the design is of importance, we don't want a lot of ink splashed all over it.

A TIP

Many collectors are fond of a little tip, and here is one worth taking notice of. I know I am on sure ground when I make it.

The stamps of Great Britain overprinted for Morocco Agencies are gradually becoming more popular, for in the Commonwealth Catalogue official figures of numbers sold are showing how scarce some of these stamps are. Now for the tip. Make sure that you get a set of Great Britain overprinted in January 1949 for use in Tangier. That is, the values from 5d. upwards to 1/-.



"SPOTTED DICK"

During the past month or two three collectors have asked which stamp is referred to when a "Spotted Dick" is mentioned? During the war the stamp printers were obviously rather hard put to it to get paper, ink, etc., of pre-war quality for those very important items we call postage stamps, and some pretty unusual varieties were issued from time to time. But perhaps, of the colonial stamps at any rate, the one that took the prize for quaintness was a 2/-

The Fairey Gannet—(Continued from page 466)

helped to provide eggs and bacon for all hands—an enterprise which was rewarded by a successful flight early next morning.

Not once, but repeatedly, many men worked all night to keep to a programmed date; and on no occasion was an aircraft late for carrier trials, which were even more important after 14th March 1951, when the Royal Navy awarded Fairey's a contract for a very large number of Gannets. Soon the machine was awarded "super priority" production status. Then the Royal Australian Navy too chose the Gannet to re-equip its anti-submarine squadrons—the order being quoted as 39 A.S.Mk.1 aircraft and one T.Mk.2 trainer, at a cost of £3,200,000.

The first production machine was completed in the summer of 1953. Shortly afterwards, two Gannets engaged on night flying operations at a Ministry of Supply establishment collided on the tarmac and were seriously damaged. In one of the first real tests of the interchangeability of components that should result from envelope jiggling, new wings, new engines and other components were rushed to the scene; and one aircraft was flying again in less than a week, the other in 11 days. Normally, such an accident would cause a delay of weeks, or even months.

So, in the early summer of this year the Gannet had reached the stage where it was a central figure in a very pleasant little ceremony at Ford Naval Air Station, near Arundel in Sussex—the handing over of log-books to the Commanding Officer of the first Gannet Flight (No. 703X), by Sir Richard Fairey. Afterwards, the pilots of the Flight made a very impressive fly-past in their new aircraft led by the last surviving *Stringbags*, which can now enter retirement confident that its successor, the Gannet, will more than maintain its proud tradition of achievement and fighting efficiency in the service of Britain's Royal Navy.

Mississippi Cotton—(Continued from page 471)

into a screw conveyor, and are taken either to a storage bin or directly to a railroad car for transport to an oil mill.

The cotton is baled at the gin under hydraulic pressure. The baler is divided into two equal sections, which are mounted on a turntable. While cotton is dropping into one section and being packed down, the other has completed a bale and Negro workers are making it ready for another load. Burlap is strategically placed to catch the cotton falling from the hopper. When the pressing takes place, the burlap is wrapped about the cotton on four sides.

With one section ready to begin a new bale, the turntable is spun and the fresh load is pressed into a bale. The workers complete the job by sliding metal bands called "cotton ties" around the compressed bale. When the pressure is removed, the cotton expands once again, but is held firm by the burlap and bands. The bales of cotton, in this stage called "flat cotton," weigh about 500 lb.

How Water Turbines Work—(Continued from page 487)

Kaplan turbines are used for very low heads of water, which seldom exceed 15 ft., with this type, and for very large quantities of water. One of their chief disadvantages is the high runaway speed. This means that if the load on the turbine is suddenly thrown off, the speed of rotation may increase to as much as three times the normal running speed. As a result all centrifugal stresses in the turbine and generator will increase nine times. This increase in centrifugal stress can be very serious, and even dangerous, if the rotating parts have not been designed to withstand this force.

The above gives the main features of those turbines which are most used today in the production of power from water. There are, however, other types of turbines which are used in special circumstances, such as the recovery of power in high pressure chemical plants. These turbines are in general designed only for the particular duty in question and hence cannot easily be described in a short summary such as this.

In conclusion it may be said that though the initial cost of water turbines is high, the running cost is very small. Thus in these days of ever increasing fuel prices it is well worth while to make use of such an inexpensive form of power as is provided by almost every country's lakes and rivers.

New Meccano Models—(Continued from page 495)

Anchoring Spring before passing it through the wheeled base. Use a Road Wheel on the lower end of the Rod to hold the base and cab together. The wheels are mounted on 3½" Rods supported in the base.

Parts required to build the Mobile Crane: 2 of No. 1; 4 of No. 2; 9 of No. 5; 2 of No. 10; 2 of No. 11; 8 of No. 12; 1 of No. 15b; 3 of No. 16; 1 of No. 17; 1 of No. 18a; 1 of No. 19g; 4 of No. 22; 1 of No. 23; 1 of No. 24; 2 of No. 24a; 6 of No. 35; 56 of No. 37a; 49 of No. 37b; 4 of No. 38; 1 of No. 40; 1 of No. 44; 2 of No. 48a; 1 of No. 52; 1 of No. 57c; 2 of No. 90a; 6 of No. 111c; 2 of No. 125; 2 of No. 126; 4 of No. 142c; 1 of No. 176; 2 of No. 187; 2 of No. 188; 1 of No. 189; 2 of No. 190; 2 of No. 191; 2 of No. 192; 2 of No. 199; 2 of No. 200; 1 of No. 213; 2 of No. 214; 4 of No. 215; 4 of No. 221.

Stamp Collectors' Corner—(Continued from page 505)

rarity. Its origin is still a puzzle to naturalists.

On the 70 din. we get a view of the magnificent cave of Postojnska Jama of Slovenia and of a rare amphibian, *Proteus anguineus*, which lives in the waters of the cave. Although it has embryonic lungs, it never leaves the water, and as it also lives in eternal darkness, its eyes are completely non-functional. With a pale body, it is difficult to detect. It used to live in many caves in South Europe, but apparently exists now only in the Cave of Postojna.

And now for the final stamp, 100 din. A salmon is pictured on it. Nothing very special about that, you will say, but just look at the design of the stamp itself, on page 505. Was there ever one better? Note what life and movement those few bubbles and circles give to the picture, and fix on the sheer symmetry of the whole design. My, how I would have liked to have designed that stamp!

That finishes the set, and I think collectors will agree that it is one worth a place in any album. With countries turning out such stamps, no wonder that collectors today are going in more for designs than anything else. Some talk a lot about the old classics, and of course they have their charm and appeal, but as far as beauty of design is concerned, yesterday has nothing whatever to teach today. Now has it?

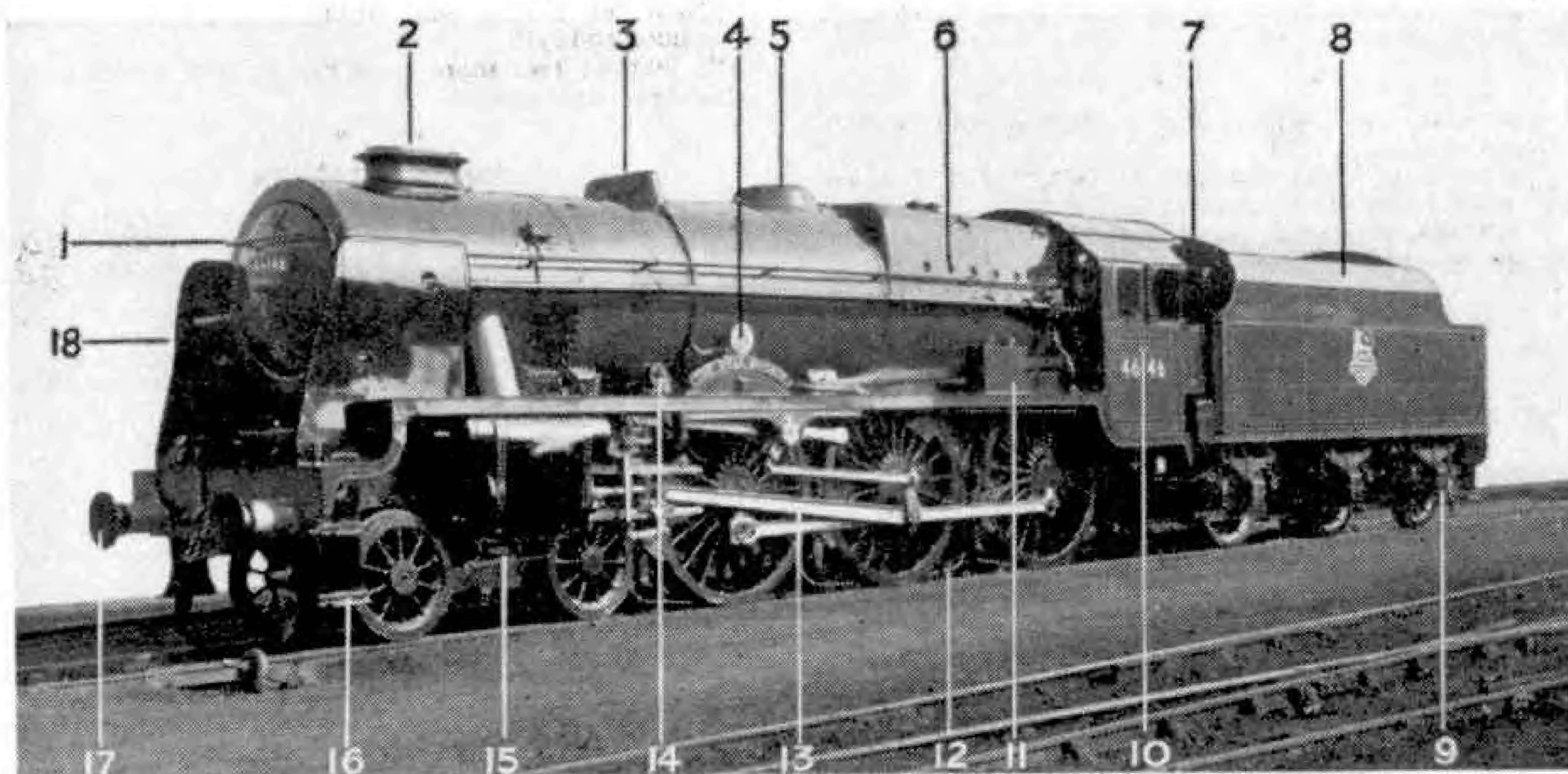
This Month's Special Articles

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Competitions! Open To All Readers

Prize-winning entries in M.M. competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

What Are These Locomotive Parts?



Here is another of those identification competitions that are so popular with M.M. railway enthusiasts. The illustration above, from a British Railways Official Photograph, shows the converted Royal Scot locomotive No. 46146 *The Rifle Brigade*. On it some of the working parts and other features have been indicated by numbers, and we invite readers to identify these components, and to give a short description of the purpose of each part, explaining quite briefly what it is intended for. For instance, No. 1 indicates the handrail on the smoke-box door. This rail is a safety provision for men working on the front end of the engine.

When a competitor is satisfied that he has identified all the parts, or as many as he can, he should write out a list of

them in numerical order, adding a note as to their purpose. Use only one side of the paper, and do not forget to add your name, age and full address on the back of your entry.

The Competition will be divided into two sections, for Home and Overseas readers respectively, and in each section there will be prizes to the value of 21/- 15/- and 10/6, together with a number of consolation prizes. If there is a tie for any prize the judges will take neatness and originality into consideration.

Entries must be addressed to *October Locomotive Contest, Meccano Magazine, Binns Road, Liverpool 13*. The closing dates are: Home Section, 30th November 1954; Overseas Section, 28th February 1955.

Beauty Spots Photographic Contest

Readers who possess cameras will have made good use of them while on holiday during the summer just ended, and if they are interested in places as well as people they will have enjoyed themselves photographing some of the beauty spots they have visited. In this competition we invite readers to send us the best of their holiday "beauty spot" photographs.

Each competitor may submit only one photograph, which must have been taken by himself. On the back of the print he should state exactly what the picture represents, and remember to give his name, age and full address.

The competition will be in the usual two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate sections for Overseas readers, and in each section prizes of 21/-, 15/- and 10/6 will be awarded. Entries should be addressed *Beauty Spots Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13*. The closing dates are: Home Section, 30th November, 1954; Overseas Section, 28th February, 1955.

Competitors who desire their entries to be returned should note the important paragraph at the top of this page.

Fireside Fun

The guide was showing visitors round the castle. Coming to the banquet hall, he said: "In this very hall, two hundred years ago, the young and beautiful Countess was foully murdered."

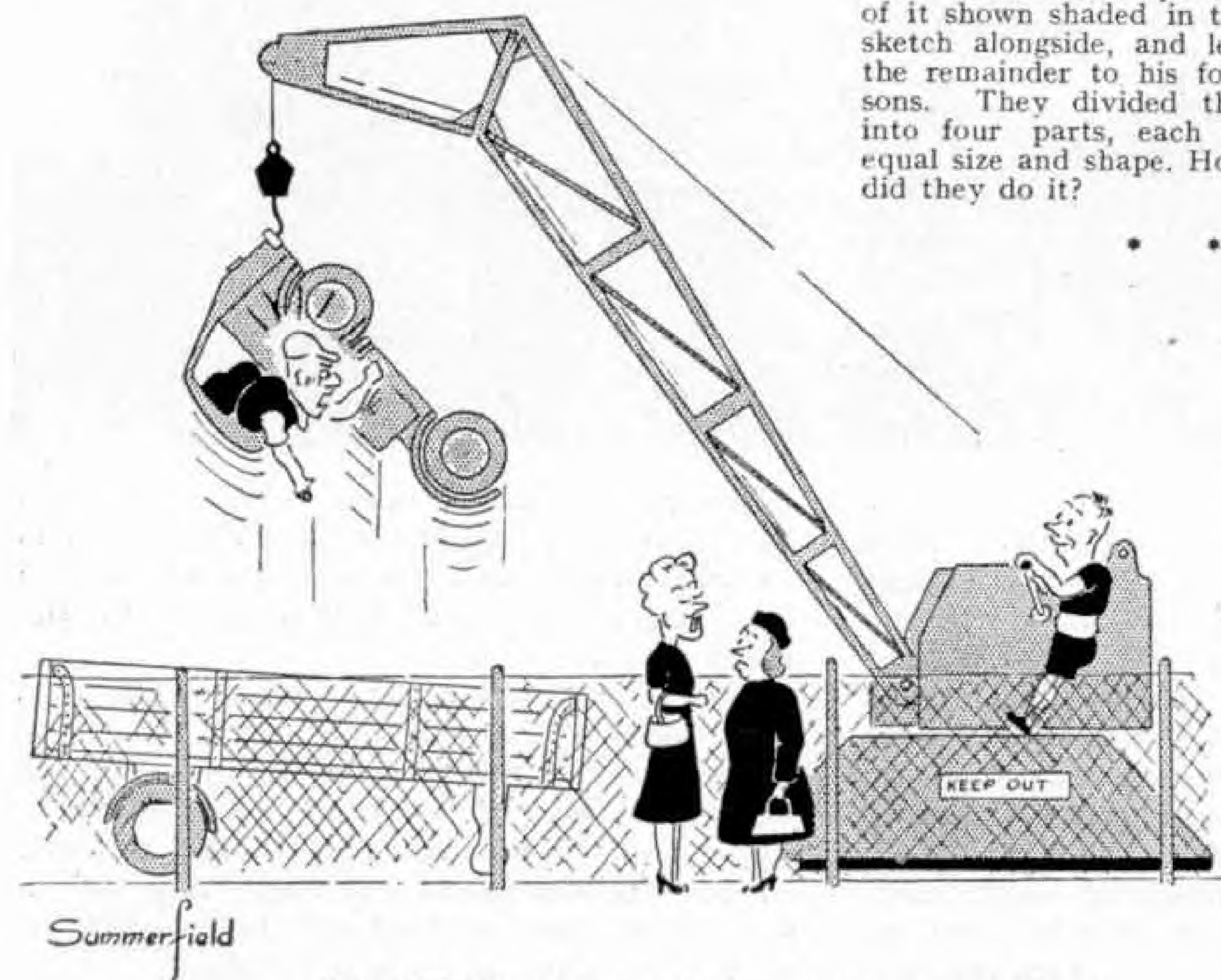
Visitor: "I thought you told us last week that it happened in the ante-room."

Guide: "I know that, but we can't go in there now; it's being re-decorated."

She was an exasperating customer and hadn't bought a thing.

"Why is it," she snapped at last, "that I never get what I ask for in your shop?"

"Perhaps, madam," said the assistant, "it's because we are too polite."



Summerfield

"My little Henry seems to have outgrown his toys."

"A person's an idiot to be absolutely certain of anything."

"Are you sure of that?"

"Positively!"

The professor had lectured for one hour on the fourth dimension. Then he asked if there were any questions. A young woman held up her hand.

"Professor," she said, "I thoroughly understand the fourth dimension, but what I would like to know is, what are the first, second, and third dimensions?"

Two mind readers passed each other. One said, "You're feeling fine. How am I doing?"

Patient: "Doctor, my head feels like a lump of lead, my muscles cramp like iron bands, and my neck is as stiff as a pipe."

Doctor: "Good heavens, man! I think you had better see a plumber."

A woman posed for a snapshot in front of the fallen pillars of an ancient temple in Greece.

"Don't get the car in the picture," she said, "or my husband will think I ran into the place."

Brown: "This cornflour is absolutely useless."

Grocer: "Why, what's wrong with it?"

Brown: "Well, I've used it on my corns for a fortnight, and they're as bad as ever."

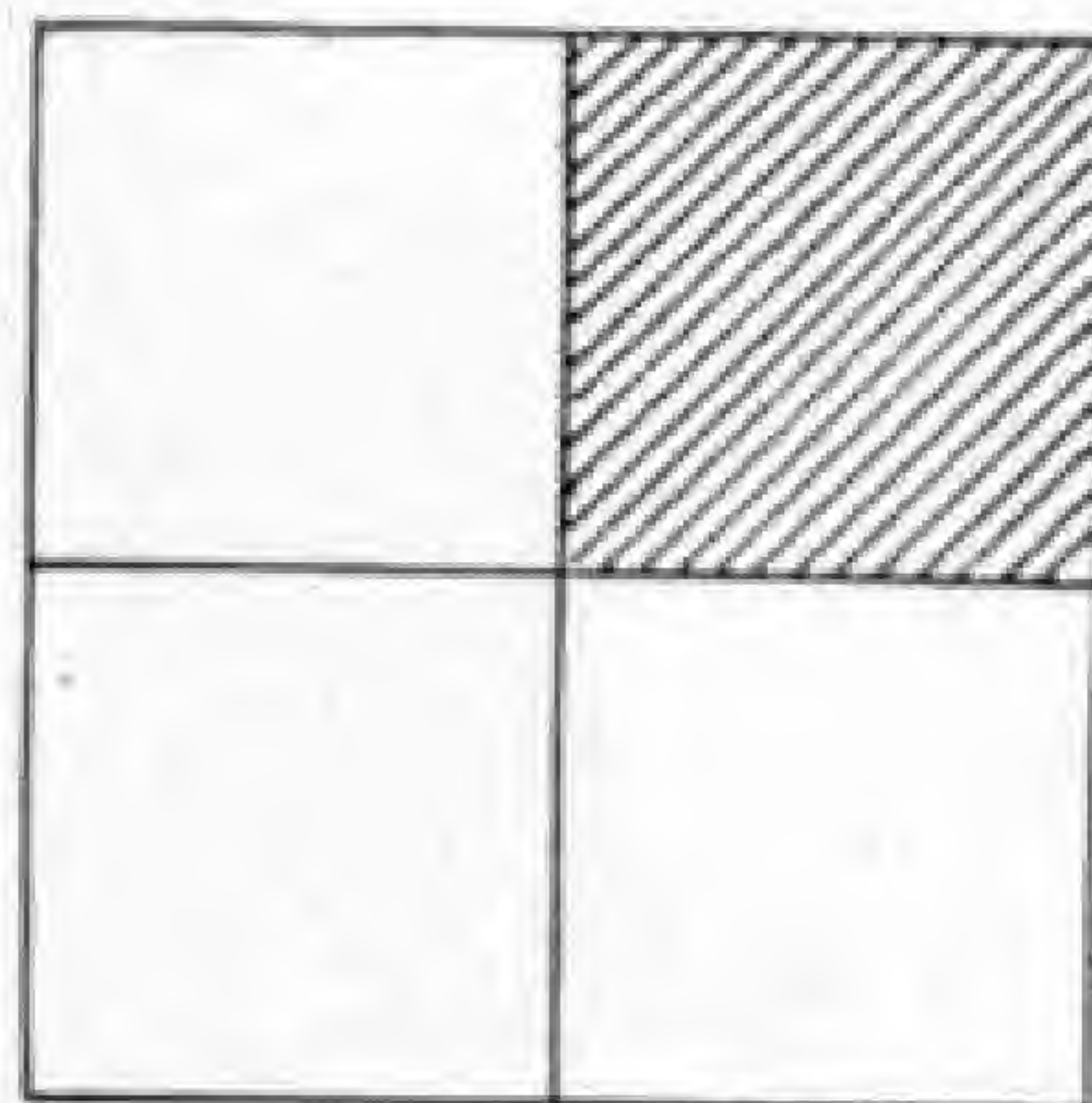
"Now tell mama what mama's little boy learned in school today?"

"I learned two more boys not to call me 'mama's little boy' any more."

BRAIN TEASERS

The Farmer and his Field

A farmer had a square field. He sold the quarter of it shown shaded in the sketch alongside, and left the remainder to his four sons. They divided this into four parts, each of equal size and shape. How did they do it?



A Water Problem

If you required to draw exactly 6 gallons of water from a pool, and all you had available were two cans, one of 4 and the other of 7 gallons capacity, how would you do it? In working out a solution you must not use any other containers, but you can throw any surplus water away if necessary.

A Case of Identity

Can you identify an 11 letter word of three syllables from the following clues: the first syllable by itself forms a word meaning incomplete; the first two syllables combined mean an associate; and the whole word denotes joint activities.

SOLUTIONS TO LAST MONTH'S PUZZLES

How Many Squares

There were 31 squares in the diagram shown on page 460 of the September M.M. This total was made up as follows:

16 small squares; 9 each composed of four small squares; 4 each composed of nine small squares; 1 "diamond" square and 1 square comprising the entire diagram.

Famous Names

1, Pasteur; 2, Sam Browne; 3, Mackintosh; 4, Sir Humphrey Davy; 5, Duke of Wellington; 6, Morse; 7, Sir H. Bessemer; 8, Anthony Eden; 9, Baird.

Hidden Proverbs

1, A stitch in time saves nine; 2, You cannot have your cake and eat it; 3, Heaven helps those who help themselves; 4, A rolling stone gathers no moss.



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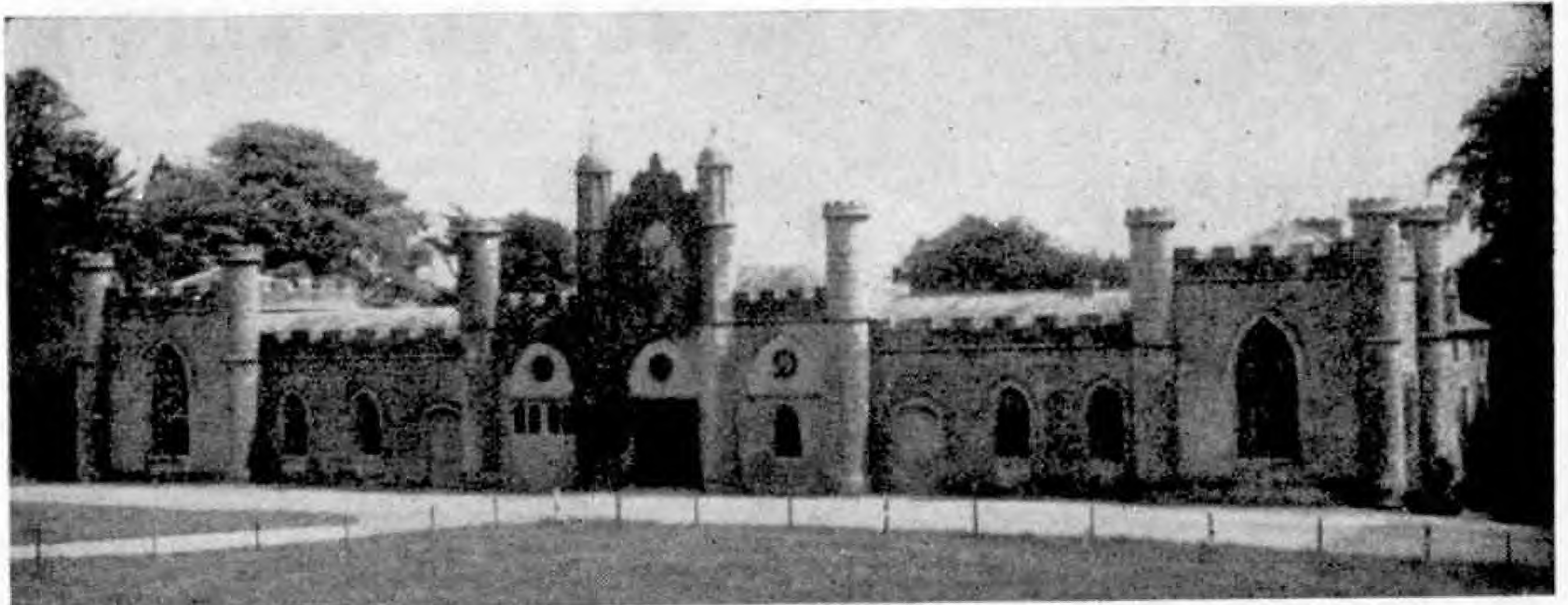
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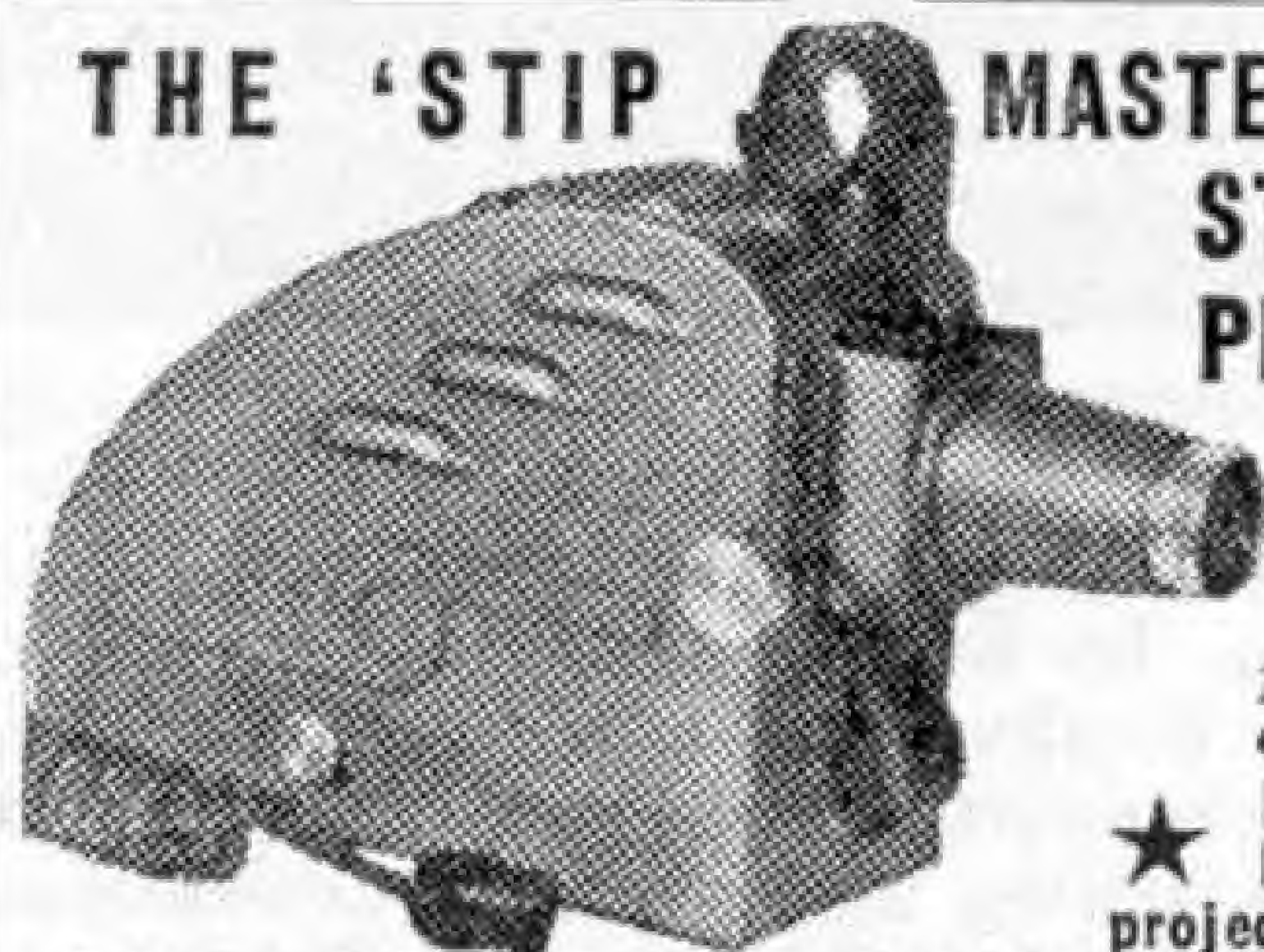
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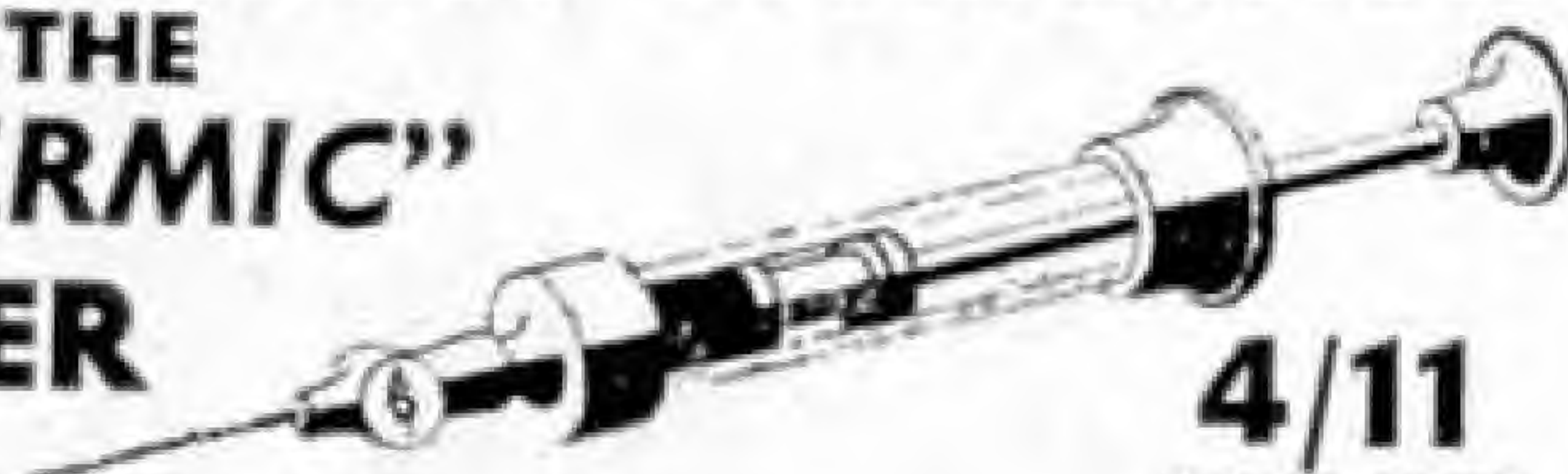
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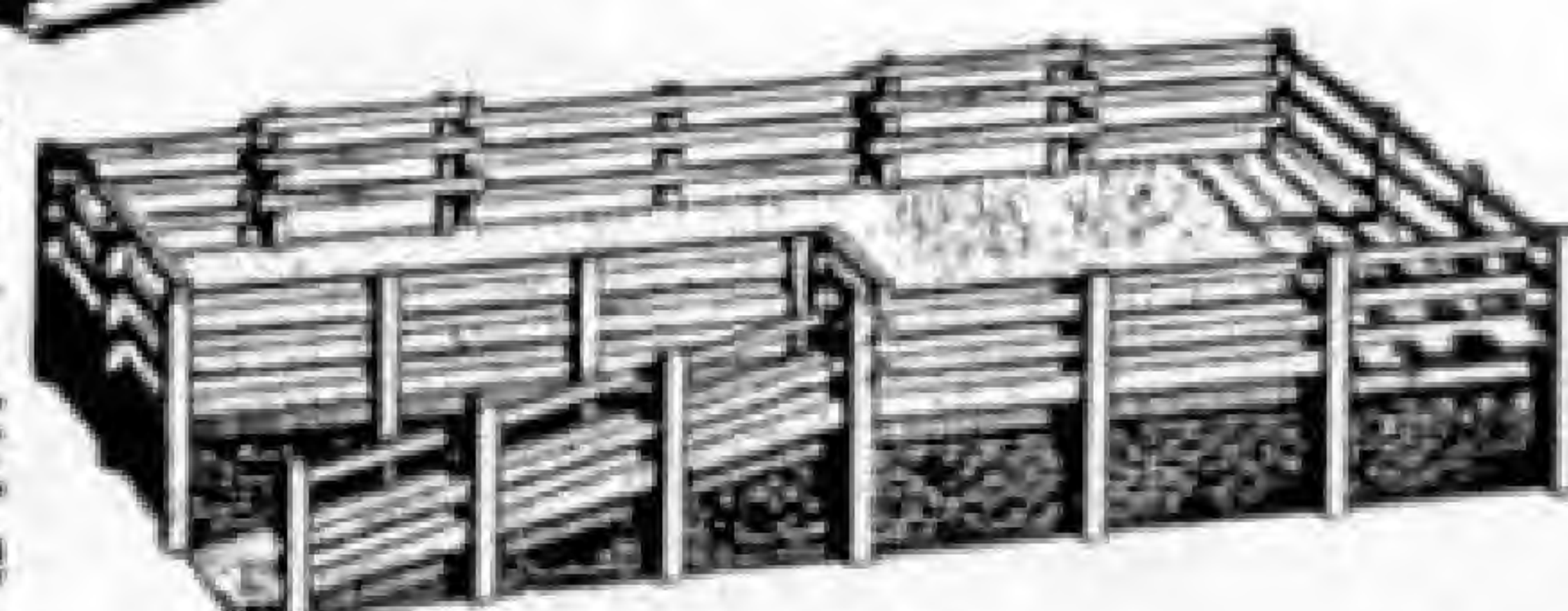
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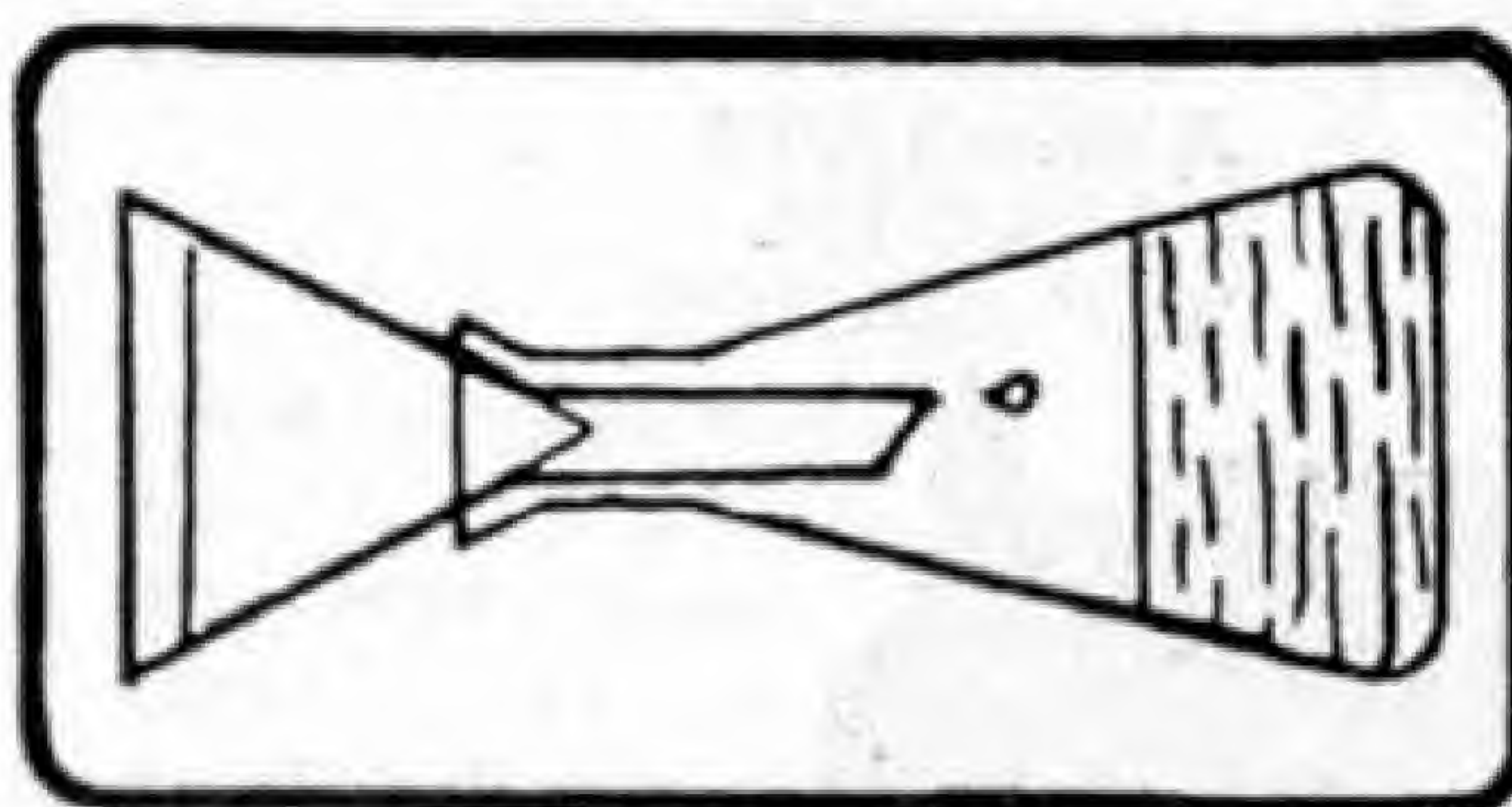
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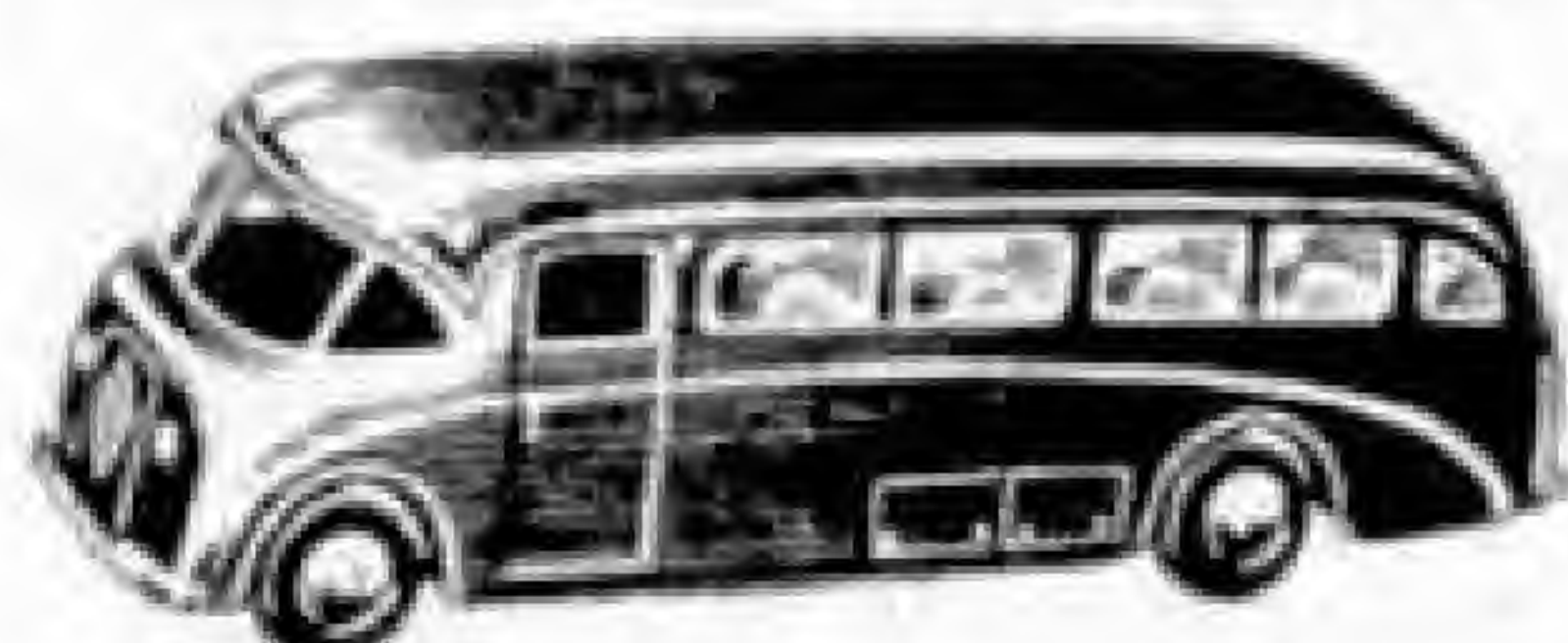
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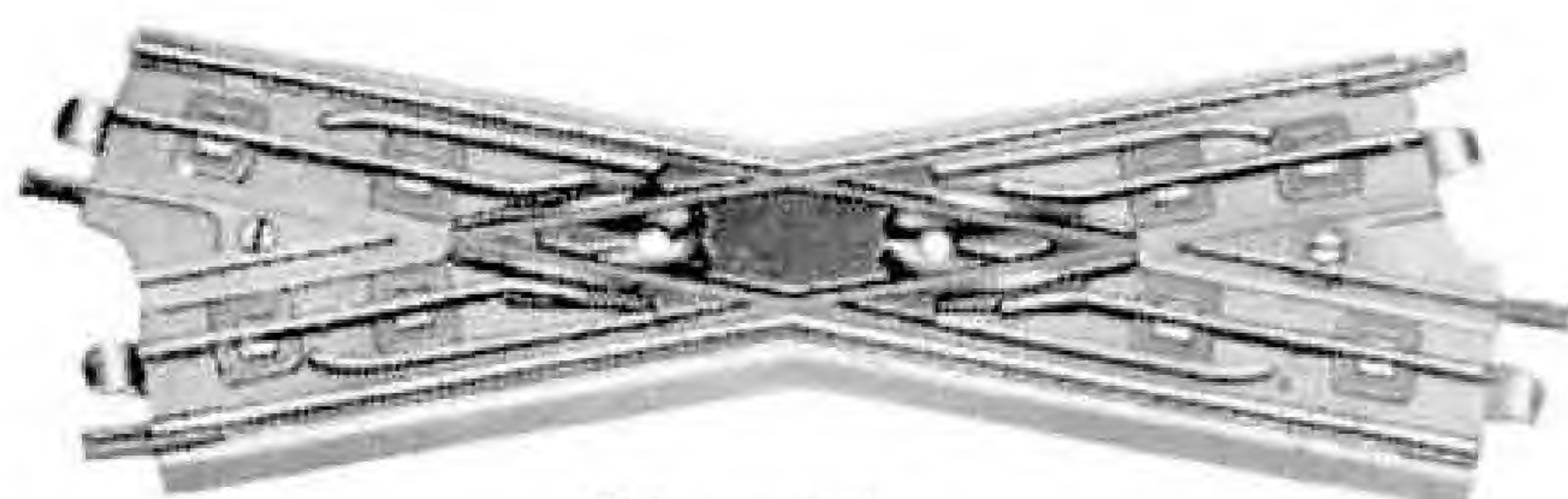
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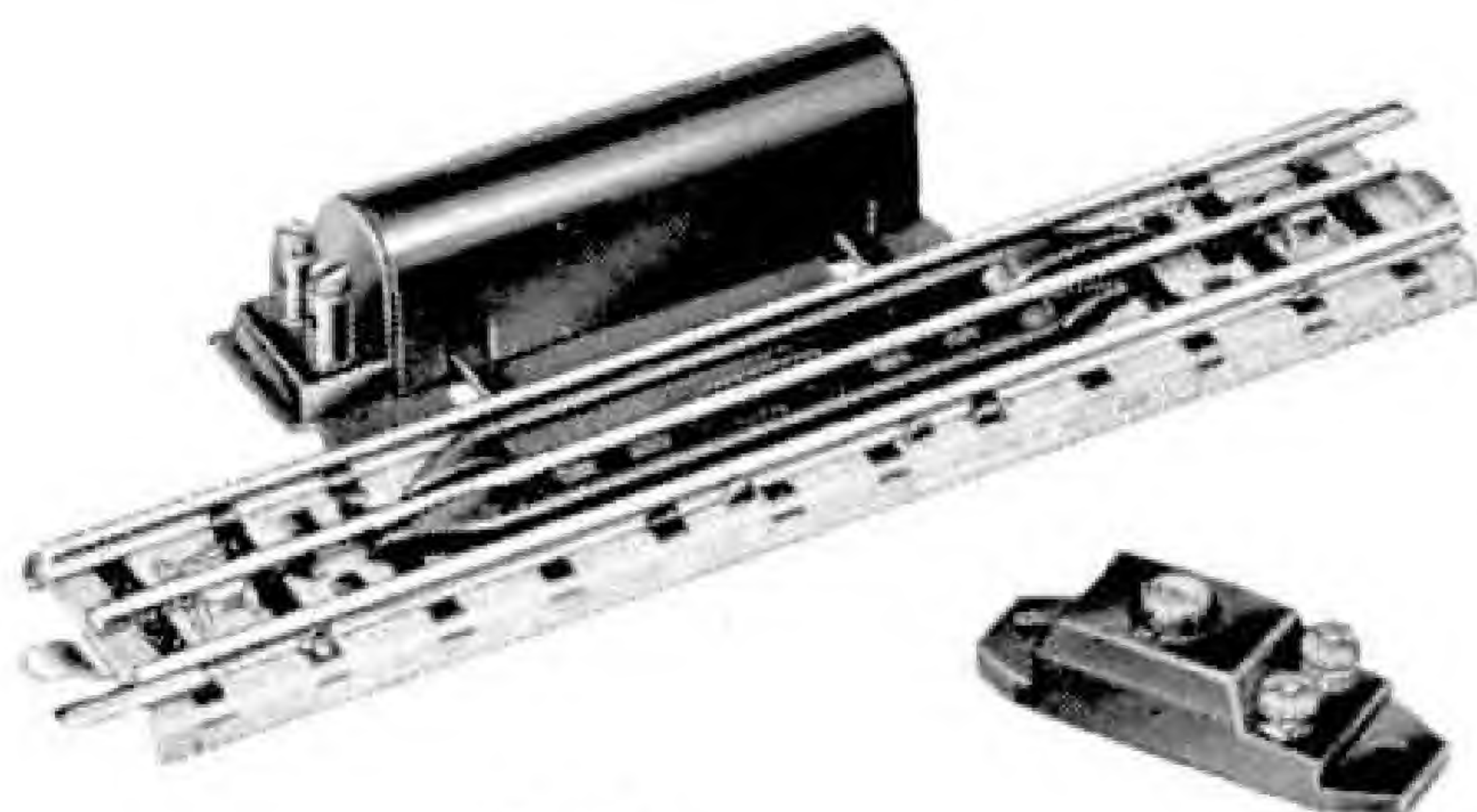


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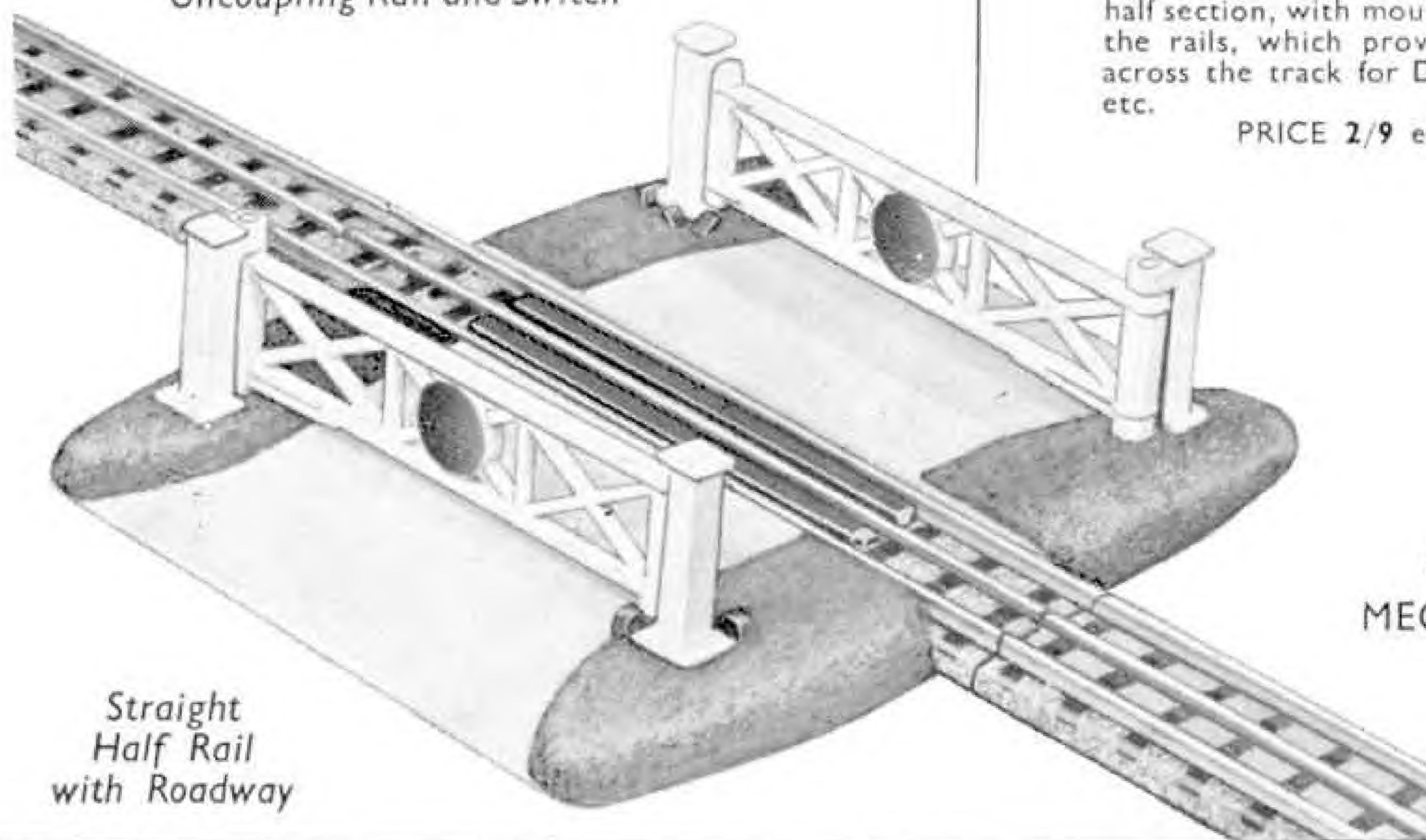
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